THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXXIII. No. 1881.] LONDON, MAY 30, 1899. [51ST YEAR. PRICE 6d.

GAS AND WATER PIPES

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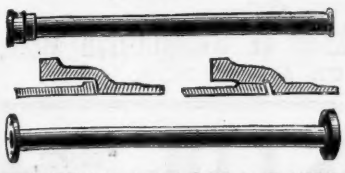

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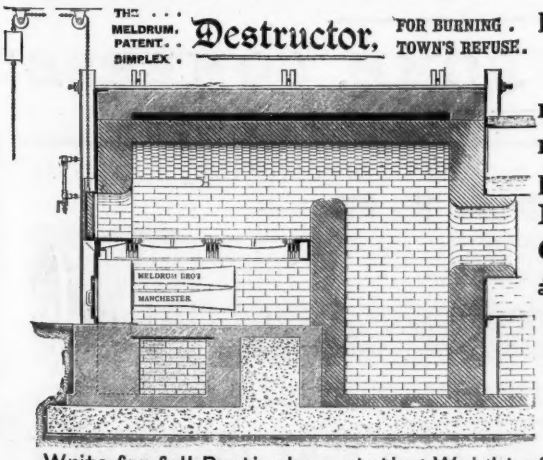

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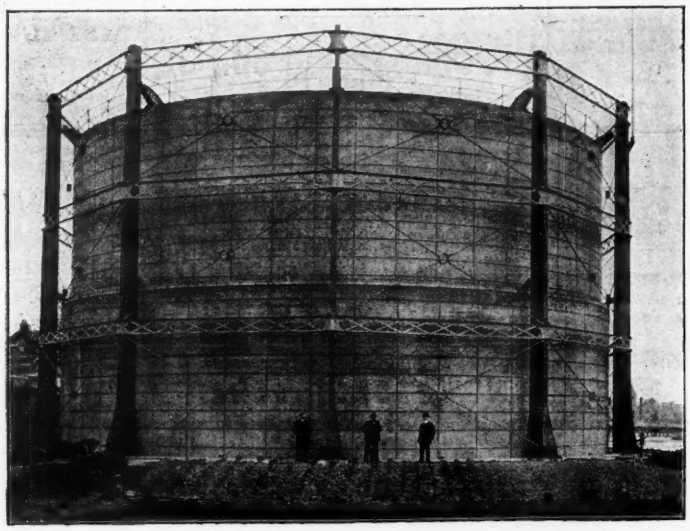

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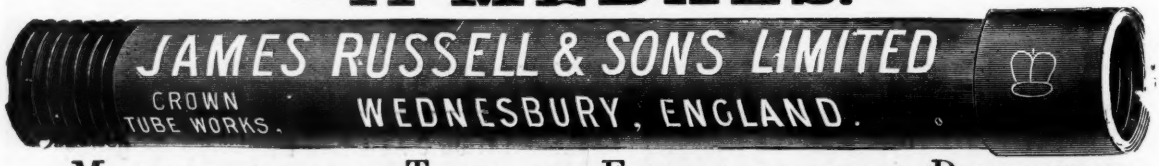

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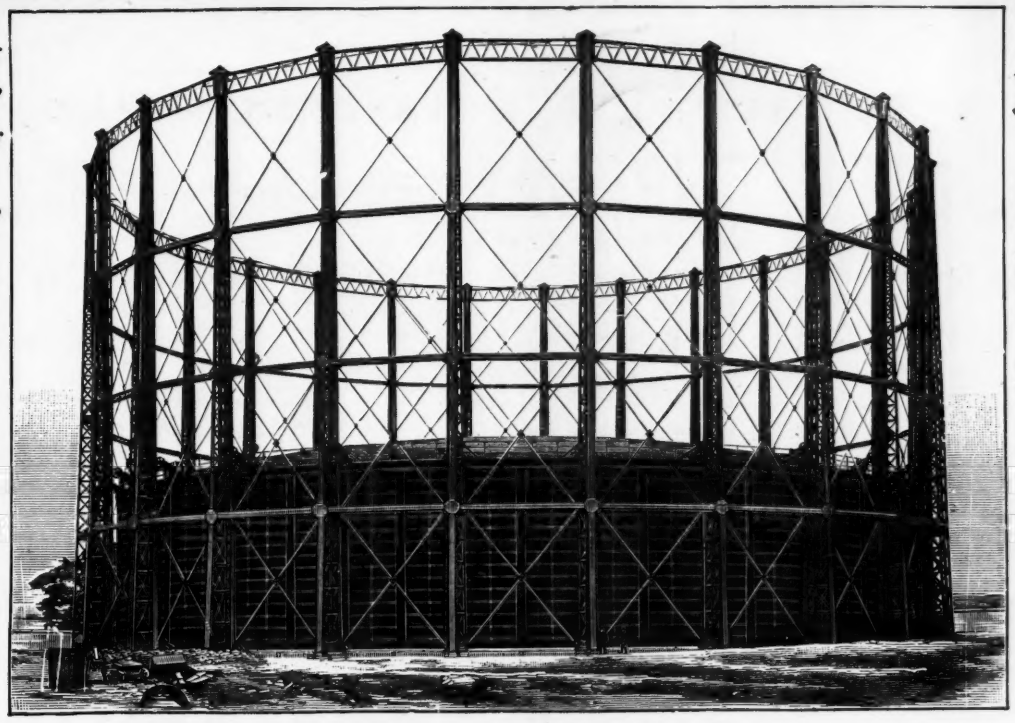

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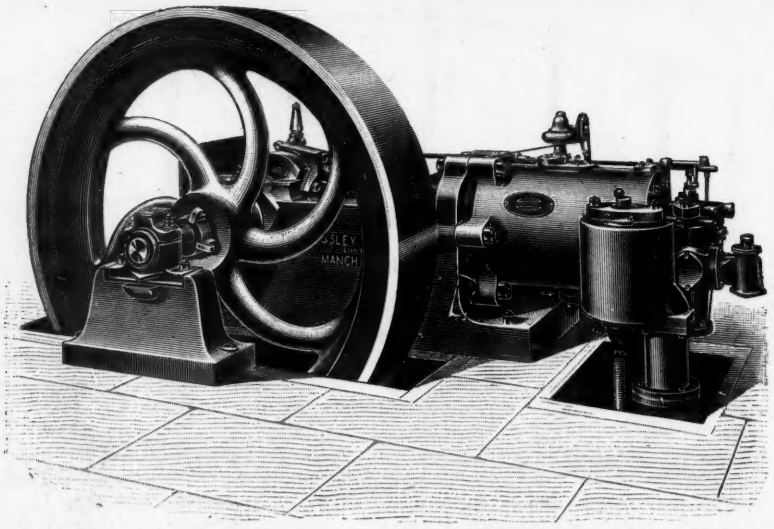

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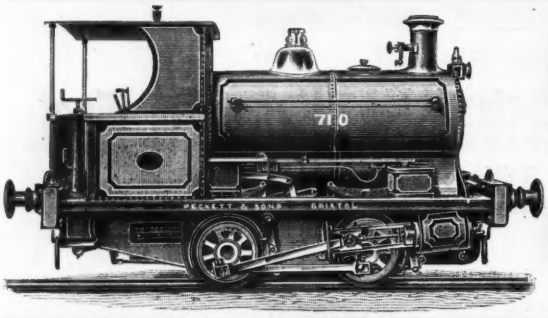

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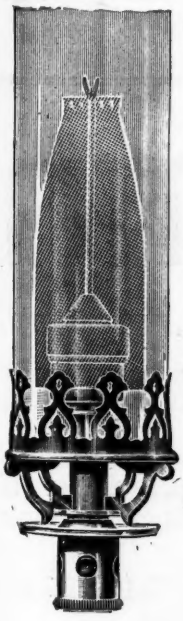

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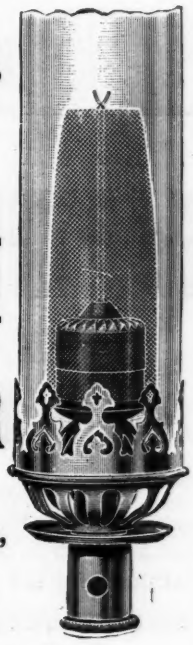

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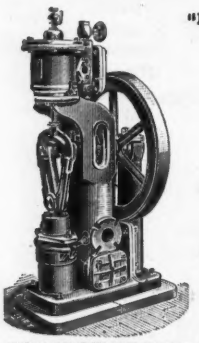

"Fig. 705. SINGLE RAM" STEAM-PUMP.

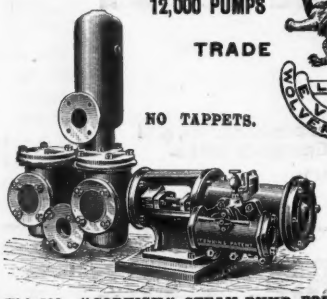

Fig. 598. "CORNISH" STEAM-PUMP FOR BOILER FEEDING, &c.

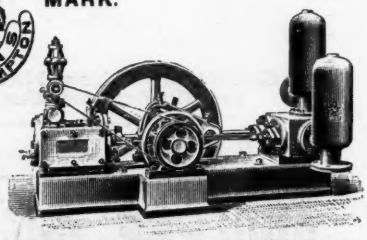

Fig. 685. "RELIABLE" STEAM-PUMP FOR TAR AND THICK FLUIDS.

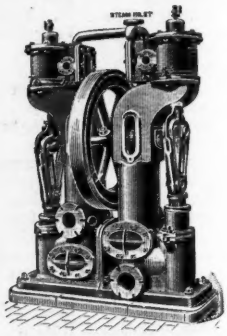

Fig. 712 "DOUBLE-RAM" STEAM-PUMP.

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OF EVERY DESCRIPTION.

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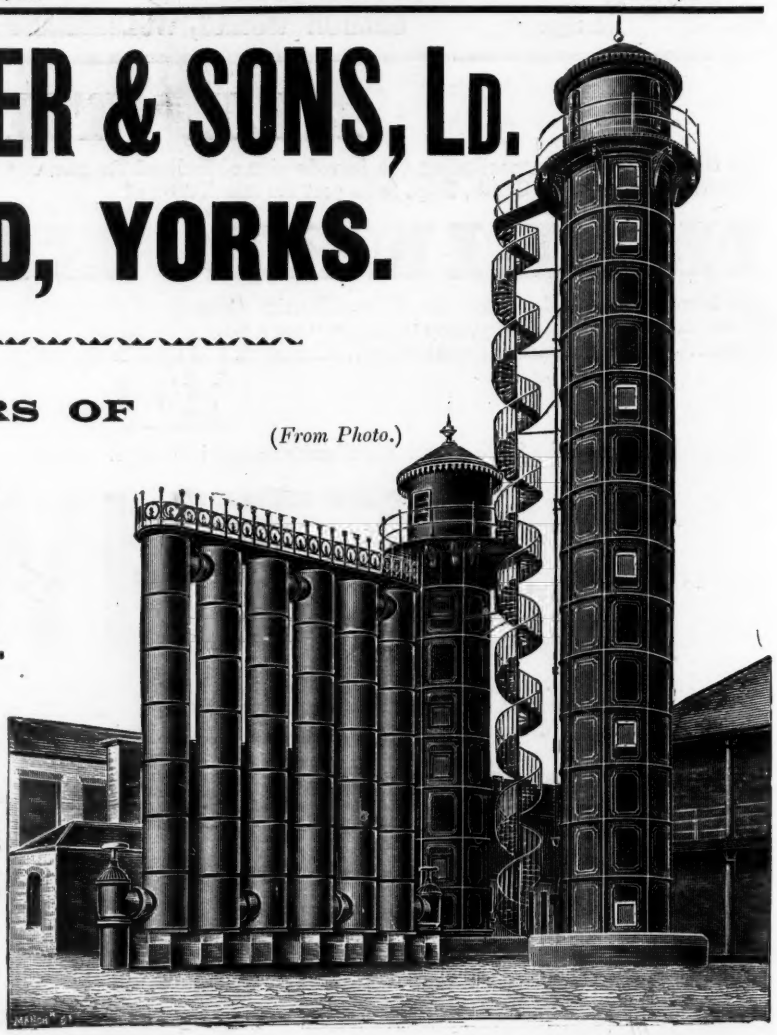

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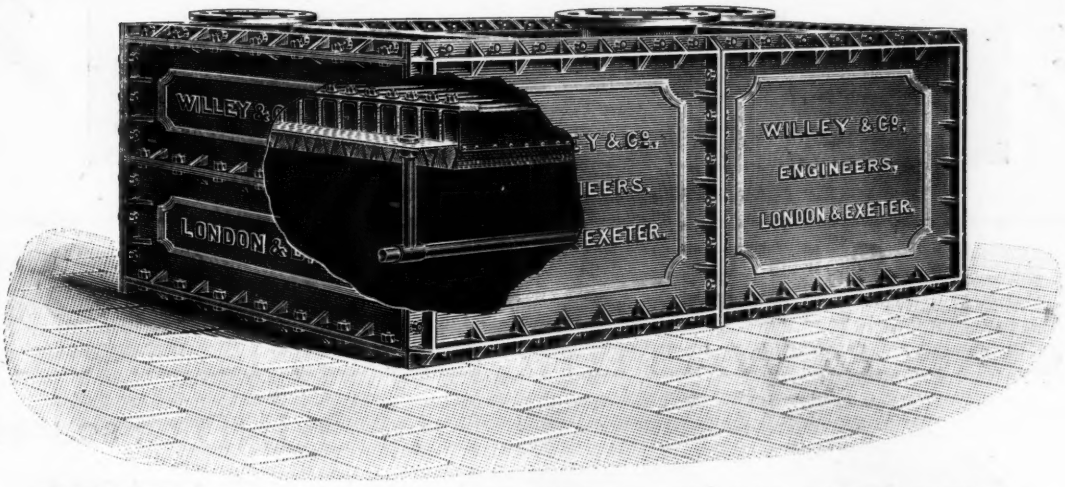

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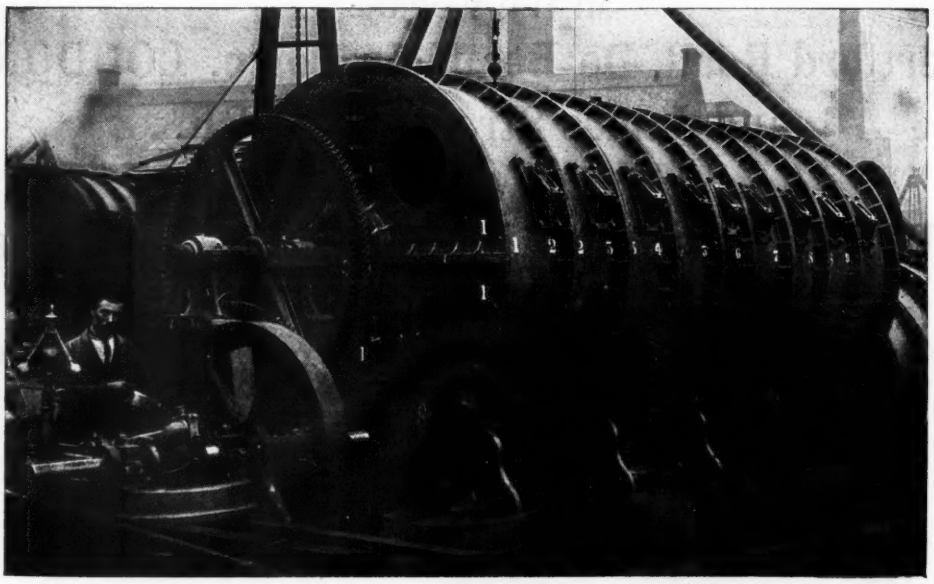

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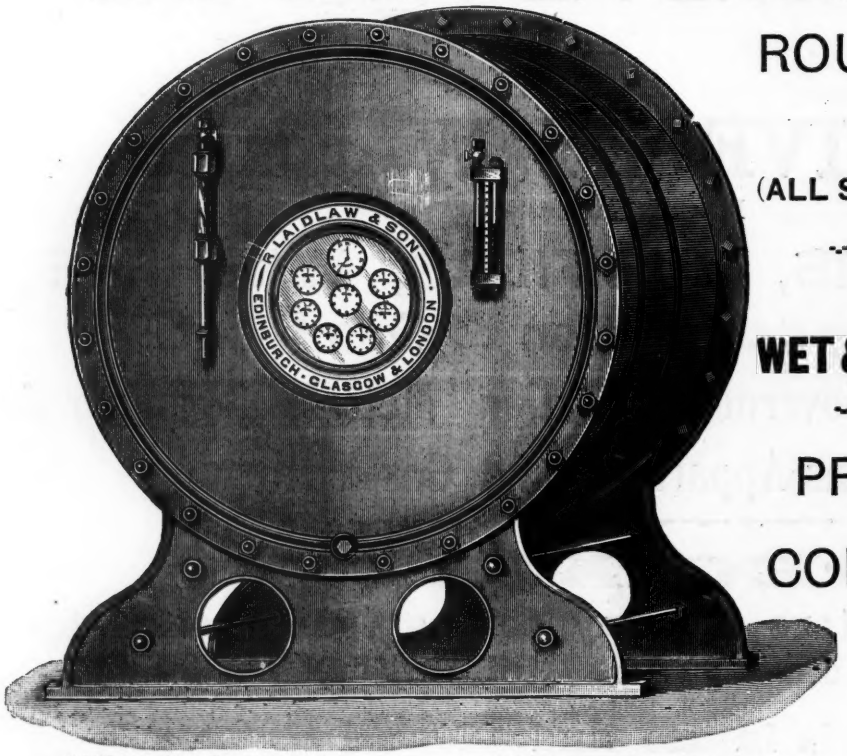

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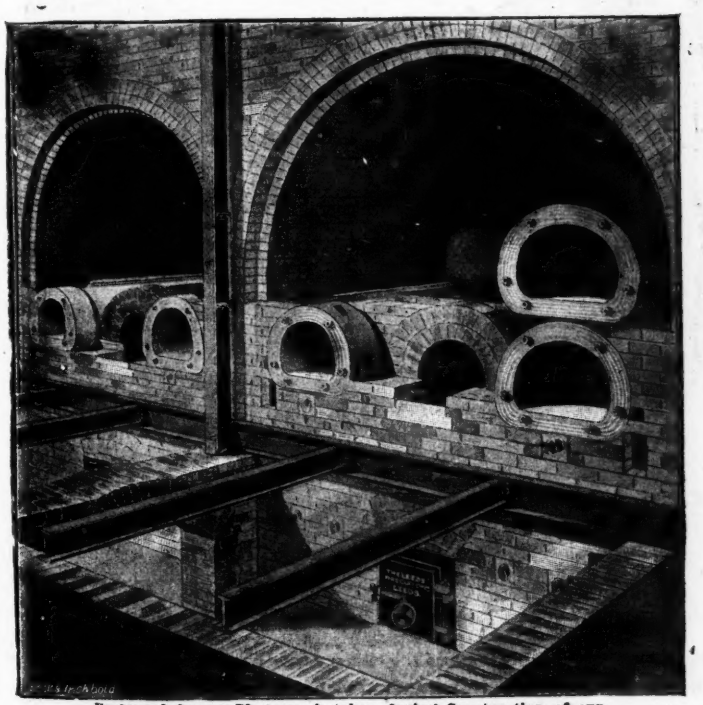

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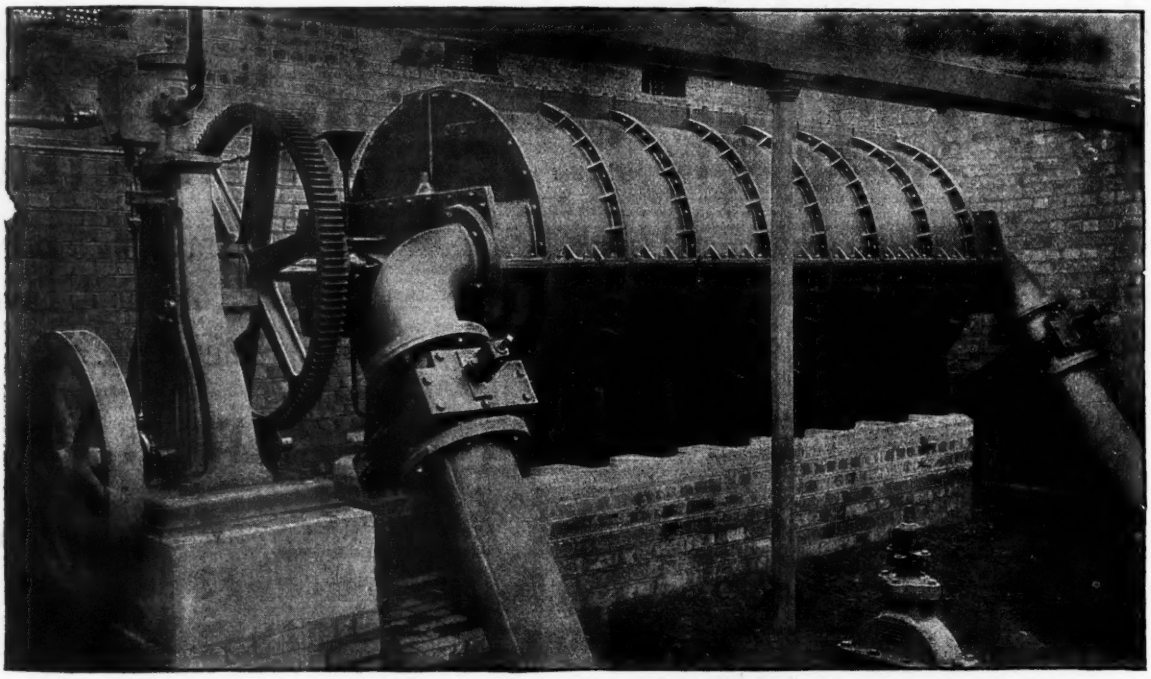

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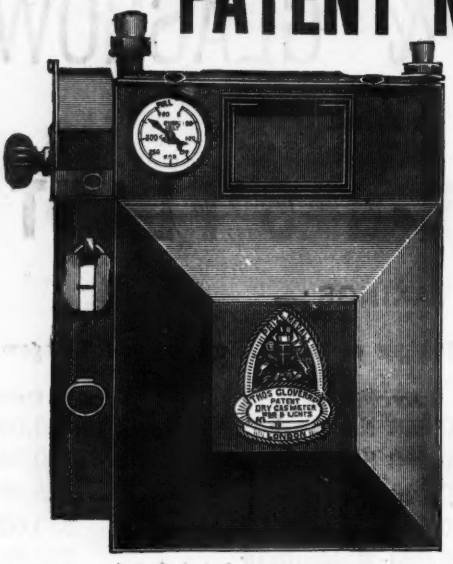

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CONTENTS.

EDITORIAL NOTES:—
GAS, LIGHTING, &c.— PAGE
The Programme of The Gas Institute Meeting 1421
Successful Gas Company's Opposition to an Electric Lighting Order 1421
Gas-Rate War in New York 1422
Sunday Labour in Gas-Works and Newspaper Offices 1422
Lord Esher and the Gas Workers 1422
The Progress of the Government of London Bill 1423
Municipal Enterprise in Electric Lighting at Worcester . . . 1423
Some Aspects of the Trade of Amsterdam 1423
Important Judgment under the Stamp Act 1423
ESSAYS, COMMENTARIES, AND REVIEWS:—
Gas and Water Companies in the Stock Market 1424
Electric Lighting Memoranda 1424
Workmen's Benefit Societies [Second Article] 1425
Aërial Sanitation—The Ideal Dwelling-House 1427
NOTES:—
An American Photometer 1428
The Economy of Hydraulic Power 1428
The Possibilities of Liquid Air 1428
Imperfections in Chemical Lead 1429
The Lighting of Isolated Residences 1429
A Liquid Air Producer 1429
An Indicator of the Turbidity of Water 1429
COMMUNICATED ARTICLE:—
Gas-Engines: The Number in Use and their Applications. By Bryan Donkin, M.Inst.C.E. 1429
TECHNICAL RECORD:—
The Coke-Handling Plant for the New Retort-House at Halifax . 1430
The Water Supply of London 1432
CORRESPONDENCE:—
Mechanical Coke-Handling Plant for Inclined Retorts 1434
The Welsbach System of Public Lighting 1434
PARLIAMENTARY INTELLIGENCE:—
House of Commons Committee—The Contest for the Derwent Watershed 1431
House of Lords Committee—
Rawtenstall Water Bill 1436
Bury Corporation Water Bill 1437
LEGAL INTELLIGENCE:—
Colchester County Court—Broom *v.* Colchester Gas Company; A Question of Liability 1438
Westminster County Court—Grand Junction Water-Works Company *v.* Passingham; A Question as to a Supply by Meter . . 1438
The Birch for a Youthful Prepayment Meter Depredator . . . 1439
A Case Under the Workmen's Compensation Act 1439
Pipe-Laying Excavations at Holiday Times 1439
MISCELLANEOUS:—
Leeds Corporation Gas Supply—A Gratifying Increase in Profits. 1439
Stafford Corporation Gas Supply—The Accounts of the Gas Department for the Past Financial Year 1439
The Quality of the Cambridge Company's Gas 1439
West Bromwich Gas Department—Annual Report and Accounts 1440
Buxton Gas Supply—The Financial and General Position of the Gas Undertaking 1440
Heywood Corporation Gas Supply—The Gas Manager's Report . 1440
Gas Supply in Shanghai 1441
Meeting of the Monte Video Gas Company, Limited 1441
The Gas-Rate War in New York—Our American Contemporaries' Views on the Question 1442
Gas *v.* Electricity for Street Lighting—Condemnation of Electric Lighting at Worcester; Incandescent Gas Lighting Suggested for Bolton 1443
Gas and Water Companies' Stock and Share List 1443
Electric Lighting Notes 1444
The Southampton Corporation and the Local Water-Works . . 1446
Notes from Scotland 1447
Current Sales of Gas Products 1449
Coal Trade Reports 1449
PARAGRAPHS:—
OBITUARY: Mr. John Hargreaves 1428
PERSONAL: Mr. T. D. Overing; Mr. P. B. Watson; Mr. W. Langford; Mr. Walter Donaldson; Mr. Joseph Radcliffe 1428
Manchester District Institution of Gas Engineers—An Acetylene Reflector 1424
The Archimedean Principle for Gases 1426
Royal Institution of Great Britain 1428
The Production of Calcium Carbide at the Niagara Falls . . . 1431
Maldon Water-Works Transfer—The Remuneration of the Plymouth Water Engineer 1434
Divining for Water—Coventry Corporation Gas and Electricity Supply—Testing Gas-Meters in Manchester 1437
Bury Corporation Gas-Works Profits—Malta and Mediterranean Gas Company, Limited—Portsmouth Water-Works Company . 1439
Ipswich Corporation Water Supply 1443
Dearth of Coke in the Birmingham District—Explosion at the Carlisle Gas-Works 1448
The Extension of the Grantham Gas-Works—Gas Profits at Cockermouth—Gas Profits at Oldham 1450

TO CORRESPONDENTS.

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EDITORIAL NOTES.

The Programme of The Gas Institute Meeting.

THE programme of the forthcoming meeting of The Gas Institute, which is to be held at the Westminster Town Hall, beginning this day fortnight, promises very well. Mr. Samuel Stewart, of Greenock, the President of the Institute, will take the chair at eleven o'clock on the first day; and the two following days' sittings will commence at ten o'clock. There will be no afternoon sittings, unless found necessary to clear off the business. It is to be specially noted that the annual general meeting of the donors and subscribers to the Benevolent Fund will be held at the close of the first morning's sitting, about two o'clock. A good list of papers has been got together; and as the order in which these are to be read will only be determined by the Council prior to the meeting, so as to suit the general convenience, we give the titles in the alphabetical order of the authors' names. Mr. William Carr, of Stalybridge, will describe "The Evolution of the Hydraulic Main." Mr. Charles Craven, of Dewsbury, will give his "Recent "Experience in Working Inclined Retorts." Mr. F. G. Dexter, of Winchester, has a paper on "The Influence "of Carbonic Acid on the Combustion of Coal and Water "Gas." Mr. J. Petty Leather, of Burnley, will discourse upon "Naphthalene Deposits: Their Cause and Prevention." Mr. John Lyne, of Wexford, is to treat of the "Advantages of Regenerative Firing for Small Gas-"Works." Mr. Thomas Newbigging has a paper "On "Differential Rates as between Consumers of Gas for "Lighting and for Purposes other than Lighting." Mr. T. O. Paterson, of Birkenhead, will descant upon "Gas "for Motor Purposes;" and Mr. Frank A. Winstanley, of Rotherham, is down for a paper on "The Extension of "the Gas Company's Responsibility to Fittings beyond "the Meter." Besides all this substantial technical fare, Mr. A. G. Glasgow will deliver the Institute lecture, on "Carburetted Water Gas with Reference to the Recent "Report of the Departmental Committee." All this is very good; and the Council and the Honorary Secretary, Mr. Andrew Dougall, are to be complimented on the result of their labours to secure an ample supply of attractive papers from members of the Institute. The circumstance of most of the contributors being fresh to the work is not its least recommendation. Their names are all well and favourably known in the profession.

The annual excursion, on the Friday, is to be an up-river trip "with variations." It comprises travel by rail, road, and river to Hampton Court Palace—with special permission to view the historic buildings and gardens—thence to Richmond and round about, finishing up at the renowned "Star and Garter." With good weather, this should be a pleasant and not too tiring day; the travelling being over short distances. The advertisement convening the meeting bears the highly significant message that "the "Council expressly desire that trading firms will not send "representatives to the meetings." It is particularly wished that this request should be acted upon in spirit, as well as to the letter; and we understand that the Council are prepared to make their wishes respected, if necessary. The Council have a claim upon the support and active co-operation of members in the course they have taken. Members attending the meeting will be free to dispose o their afternoons and evenings, with the exception of Wednesday (the 14th), when the President and Mrs. Stewart will hold a reception at the Westminster Town Hall.

Successful Gas Company's Opposition to an Electric Lighting Order.

A PRECEDENT worthy of particular regard was created in Parliament just before the adjournment for Whitsuntide, by the refusal of a House of Commons Committee, presided over by Sir Henry Fletcher, to confirm an Electric Lighting Order, after hearing evidence on behalf of the local Gas Company. Hitherto it has not been the practice of Parliament to admit the *locus standi* of a Gas Company in general opposition to an Electric Lighting Order or Bill. The case now under notice must have been considered exceptional by the authorities concerned; and the evidence laid before the Committee tended to show that there was something queer about the origin of the Order. It was granted by the Board of Trade, notwithstanding the opposition of the local Gas Company, to the "Maerdy "Electric Light Company, Limited"—this being the

name of a colliery village in the Rhondda Valley. The supply of gas in these villages has often given occupation to the Board of Trade and to Parliament. In 1883, the Ferndale Gas Company obtained a Provisional Order under the Gas and Water Works Facilities Act; and under this statutory protection they actually supply gas in the villages of Ferndale, Tylorstown, and Maerdy. In 1897, the Maerdy Electric Light Company was formed, and began to supply in the village, by consent of the Rhondda Urban District Council. The Council are themselves suppliers of gas in the Rhondda Valley; and the Ferndale Gas Company had an idea that the Council were not averse to seeing the Maerdy Electric Light Company prosper at their—the Ferndale Company's—expense. Indeed, the Ferndale petition alleged that the electric lighting scheme was really an organized attack with the object of depreciating their property, for obvious reasons. The testimony of the local witnesses disclosed the fact that the electric lighting business was a small and struggling one. Mr. Thomas Newbigging, for the Ferndale Company, showed that the Electric Lighting Order would take the best of the Maerdy district. He declared that if the Order were passed, the Gas Company would have to ask to be relieved from supplying Maerdy, and the capital sunk in the district would then be lost. What applied to Maerdy might be repeated at Ferndale and Tylorstown, with the result that the District Council would be able to buy up the undertaking of the Gas Company for an old song. Mr. Newbigging's point was that there was not room for an Electric Light and also a Gas Company to live side by side in the proposed area. The district would be afflicted with two bankrupt concerns. The fact of an electric lighting venture being started was no reason for giving it statutory encouragement to ruin the Gas Company. In the event, as already stated, the Committee decided to refuse the confirmation of the Order. This may prove a momentous decision, if only for the effect it must have of giving a much-needed lesson to the Board of Trade, who have been far too yielding in the matter of granting Orders to speculative electric lighting concerns in the very teeth of Gas Companies' opposition. So hopeless has this kind of opposition been, that Gas Companies have given up the attempt to persuade the Board of Trade to refuse Orders to electric lighting schemes which could have no end but disaster. This Maerdy precedent will put fresh heart into those who would stay the squandering of public and private capital upon such hopeless ventures.

Gas-Rate War in New York.

The business side of the illuminating gas industry of the United States is far from exhibiting the humdrum character of our own highly respectable system of statutory companies and monopolistic local authorities. It has been remarked on previous occasions in these columns that the ways of American gas administrations are peculiar. The gas supply of British cities and towns has no secrets for anybody. The accounts of the undertakings are published; and financial operations in gas are carried on under the simple rules of the auction-room. American practice is altogether different. The sense of security which sends the British gas director comfortably to sleep at his board meetings is altogether absent from the breast of his closest Yankee analogue. Similarly, the position of the American gas consumer is very different from that of his British prototype. Mr. A. C. Morton, of the Corporation of the City of London, being dissatisfied with the existing Metropolitan gas settlement, sighs for a return of the days of competition in gas supply. If the distinguished Corporator will take passage for New York by the next boat warranted to keep off the Cornish coast, he will find himself in a few days transported to the Golden Age of his regrets. For New York is actually again in the throes of a "gas-rate war," as will be seen by the account of the affair, taken from our American contemporaries, which appears in our news columns. As usual, it is not easy to understand the local journalistic story—partly by reason of the obscurity of the diction, but chiefly because these upheavals are never preluded by open discussion of the premonitory signs of any impending trouble. The great American gas business is worked by astute gentlemen who do not show their hands to anybody. One of our American contemporaries remarks that "close observers who "have followed the development of conditions in the New "York gas situation" will not be surprised at the outbreak of a war of rates between the erstwhile associated local Gas Companies. But what has there been to observe? Have any of the Gas Managers' Associations, or has one of the technical journals, touched upon the possibility of an economic eruption in comparison with which the usual small talk about gas topics must appear the veriest trifling? It is confessed, now "the fat is in the fire," that the whole affair is an unpleasant one for everybody; but the most depressing thing about it all is the proof it affords of the economic blindness and backwardness of the American State Governments. All the money sacrificed in this mad contest between rival private interests will have to be made good, and more, by the docile American public. The winners in the affray will build themselves bigger and faster steam-yachts, and pay more for their European tours than ever; and the New York gas consumer will find his bills adjusted to suit. The most striking moral of the story is the one we have often repeated—that people on this side with money to invest had better leave all American gas "securities" severely alone. These things are for home consumption exclusively.

Sunday Labour in Gas-Works and Newspaper Offices.

The recent collapse, under a mountain of opprobrium, of the insidious attempt to destroy the British Sunday by the totally uncalled-for innovation of seven-day newspapers, merits passing notice here, if only because the "Journal" represents an industry which has had to struggle hard for the relegation of Sunday labour to the category of the non-essentials. It is not long ago that we had occasion to discuss the report of an eminent Belgian publicist on the, to him, almost unintelligible phenomenon of the general cessation of work in this country on Sundays. Belgium, like so many other Continental countries, having lost the Sunday rest from unnecessary labour, but being desirous of recovering it, was confronted with the difficulty of ascertaining how and why the venerable institution had been so very well preserved in England. As we showed at the time, the Belgian Government were not particularly well served in regard to their inquiry, seeing that they confided it to a gentleman who was possessed with the idea that Trade Unionism had something to do with the maintenance of the British Sunday. The recent happy failure of a couple of London newspaper proprietors to "carry on the "record of the week's doings in unbroken sequence,' should be more effectual than any amount of official investigation in enlightening Continental opinion as to the hold which the Sunday has upon the people of the greatest capital that the world has ever known. We mention the subject here because we have noticed that the extensive machinery of the public platform throughout the land has been set in motion with the laudable object of recording a protest against the seven-day newspaper. And rightly so—for the innovation would not have ended where it began. The agitation, however, was not a little factitious. The heart of the British public is sound enough; but its head is not always very strong. We have in our midst a class of busybodies who are never so happy as when they are getting up and carrying on public meetings with the object of condemning somebody or something—say, Armenian outrages or London seven-day newspapers—with which, strictly speaking, they have nothing actually to do. But, curiously enough, the real objects of these meetings are usually foreign to the locality; and the wire-pullers give themselves infinite trouble to lash public indignation at second hand. We would take this opportunity for asking those worthy provincial magnates who so lately raised the "howl of deprecation" over the seven-day newspapers of Fleet Street, to inquire for themselves whether the record of their own local institutions and industries is clean as regards non-essential Sunday labour. In how many towns throughout the land do the gas workers have a Sunday off, as a regular thing? The Union does not mind, so long as the men on the Sunday shift get their double pay. This is a matter not of recompense, but of right; and unless the long, slow movement for the reduction of Sunday carbonizing in British gas-works receives a needed impetus from the late excitement over the seven-day newspaper issue, the latter will smell strongly of hypocrisy.

Lord Esher and the Gas Workers.

The intelligence of the death of Lord Esher, ex-Master of the Rolls, will scarcely recall to the mind of the present generation of gas managers the great emergency of the gas industry—the first strike of London carbonizing hands in

1872. It was in connection with this organized revolt that the leading case of *The Queen v. Bunn and Others* came before the late Judge, then Mr. Justice Brett, who sentenced the stokers who had broken their contract of service without notice to twelve months' imprisonment with hard labour. There was a tremendous hubbub made over this exemplary sentence; and the Home Secretary of the day (Lord Aberdare) bowed to the storm, and remitted eight months out of the term. Still the public had had a sharp lesson respecting the recklessness of Trade Unions; and when the original reproach of lawlessness was lifted from these Societies by the legislation of 1875, promoted by Lord James, a special exception was made for the case of workmen employed in gas and water undertakings. It is not supererogatory to remind those whom it may concern that this exceptional legislation still applies to the servants of these undertakings; and none of the special publications issuing from the office of the "JOURNAL" has been in more constant demand than the reprint of the operative clause of the Act which assures the supply of gas and water from Labour conspiracies. If a new generation of gas managers has sprung up since 1872, so likewise has a new order of Labour agitators grown into such power and influence as the law allows them. On the whole, however, with the exception of a few scatter-brain mountebanks of the 1889 brood, who have since found their level, the younger Trade Union leaders have kept fairly within the four corners of the law. This is no place to discuss the position of Lord Esher among the great lawyers of the present century. It has been stated that the strong views against the lawfulness of trade and industrial combinations and conspiracies to gain particular ends which he took in the case of the gas stokers, influenced his judgment to the end, and made him take the wrong side in the famous Mogul Steamship case. If this was his weakness, it was one that leant towards virtue's side. It is interesting to note, as disproving the once popular notion that Lord Esher was out of sympathy with the working classes, that the late Judge expressed the opinion that the leading case of *Priestly v. Fowler*, which was the origin of the doctrine of "common "employment," was wrongly decided. As President of the Court of Appeal, Lord Esher took part in deciding some important gas cases; and he was connected with the industry by relationship—his brother, Sir Wilford Brett, K.C.M.G., being the Chairman of the Buenos Ayres (New) Gas Company, Limited.

The Progress of the Government of London Bill.

BEFORE the Whitsuntide adjournment, the House of Commons finished the Committee stage of the Government of London Bill; so that the chief piece of constructive legislation of the session is now practically out of danger. The official opposition to the measure having died out as soon as the House got to business, Mr. A. J. Balfour, for the Government, displayed a most conciliatory temper, and almost invited the House to make the Bill its own. This politic conduct had the natural effect of sobering the enemies of the measure; for there is nothing more disconcerting to critics of the "captious" variety than being politely asked to take a hand at the work. In the end, the new order for the local self-government of London will be pretty much as the Bill originally sketched it. The forces of the Opposition were concentrated upon two or three amendments which were by courtesy described as of vast importance. Among other things, it was urged that the delimitation of the new administrative areas ought not to be left in so many instances to the Privy Council and the Commissioners. Some of the members who claim to represent the majority of the London County Council in the House of Commons made a great fuss over this point; and it was given up to them without any difficulty. A useful amendment makes the new Borough Councils the Overseers for all purposes relating to rates and rating. For registration business, the Town Clerk will be the Overseer. This is a step in the direction of concentration of powers which will probably be followed up throughout the country as opportunity serves. The accounts of the Councils will be audited officially and effectively; that old imposture, the audit by Elective Auditors, having been dropped.

Municipal Enterprise in Electric Lighting at Worcester.

AS pretty an object-lesson in municipal methods as we have had for some time is presented by the proceedings of the Worcester Corporation over the lighting of one of the narrow old streets of that ancient city. For the last few years the street in question, like the other thoroughfares in the centre of the city, has been lighted by electricity with only modified success. It is true that one member of the Corporation says that the street has always been better lighted by electricity than by gas; but, on the other hand, there is the statement of the Mayor that he "could not find the light in the street until it was pointed "out to him where the lamps were." Probably the truth lies somewhere between these extremes; and at least it is safe to conclude that the electric lighting has not given satisfaction to those who live and carry on business in the thoroughfare in question. Because of this, the Watch Committee of the Corporation, who have charge of the public lighting, opened up negotiations with the Gas Company to replace the electric lights with incandescent gas-lamps; and now we have the interesting spectacle of the Electricity Committee begging to be allowed to continue their "experiments," and appealing to the "patriotism" of their fellow-members of the Corporation not to cast a slur upon a municipal undertaking! No comment could add to the effect of the discussion which took place at the meeting of the Watch Committee reported elsewhere. As an illustration of the arguments which may be used for deluding the ratepayers into believing that municipal undertakings are invariably for their benefit, the report is complete as it stands. It is a perfect object-lesson; but it is one which will continue to be lost so long as men are unwise enough to take phrases for facts, and believe that there is something sacred in the things which are labelled "Progressive," or in the principle of Municipalization.

Some Aspects of the Trade of Amsterdam.

WHO habitually reads the official "Diplomatic and Con- "sular Reports" published regularly by the Foreign Office? It is to be feared that very few people, even when closely interested in the subject-matters, avail themselves of these original sources of industrial and mercantile information, but are content to take the skimmings occasionally reproduced in the newspapers. It is very unsafe, however, to trust to newspaper selection in respect to subjects of solid interest. There has just been presented to our notice the brief, but most informing and suggestive, report of Mr. Consul Robinson on the trade of Amsterdam for the past year. We wished to know if Her Britannic Majesty's Agent in the Dutch capital had anything to say about the withdrawal of the Imperial Continental Gas Association from the city; but he does not mention the incident—which is negative evidence as to the perfection and easy working of the transfer arrangements. He makes a good many striking observations upon other matters which do not come within our province, though the temptation to touch on them as illustrations of the working of current systems of national economy is very acute. Consul Robinson remarks, among other things, that artificial indigo, made from coal tar, still costs more to produce than the natural dye-stuff, the market price of which it has nevertheless considerably depreciated. The Consul is among those British Agents abroad who hold that "unless the United Kingdom adopts "the metrical system of weights and measures," and also the classification of iron and steel manufactures which obtains on the Continent, "she may look on the Con- "tinental, and perhaps on other, markets as lost to her." He says, by way of clinching his argument on this head, that he has seen "both in Germany and in this country, "the change to a metrical system of weights and measures "carried out with far less trouble and inconvenience than "seems to be feared in Great Britain." He cannot refer in these terms to the Netherlands currency.

Important Judgment Under the Stamp Act.

THE recent decision of the Lord Chief Justice, as given in the case of *Attorney-General v. Carlton Bank, Limited*, is of considerable importance, and will occasion much surprise to the commercial world. The facts of the case were, briefly, that the defendants, whose business apparently consisted chiefly of money-lending, paid a solicitor £100 a year to collect their outstanding debts. The solicitor employed kept an account-book, in which he entered all the moneys received by him for the bank; and when he from time to time paid over such moneys to his employers, an official of the bank initialled or otherwise marked the book to indicate that the amounts set out therein had been duly

accounted for. The Crown contended that each of such acknowledgments by the bank officials constituted a "receipt" within the meaning of the Stamp Act and sought by this action to recover penalties from the bank for not having caused such receipts to be stamped. With this contention the Lord Chief Justice agreed, and accordingly gave judgment for the Crown for £480 and costs. The importance of this decision lies in the fact that it declares it to be the law that any acknowledgment of money paid by one servant of an employer to another is liable to stamp duty. For his Lordship, in giving judgment, said:

> The solicitor, having received money, and being under a liability to account for it—and, indeed, if he were a servant being liable to prosecution if he embezzled it—had an answer in these entries to any demand made upon him in respect of such moneys. Could he say that that was not a receipt within the meaning of the comprehensive words of the statute? . . . It seemed to him, after a good deal of careful consideration—and, he confessed, beginning with the impression that this was not a transaction which the Legislature probably contemplated as requiring a stamp—that he was obliged to come to the conclusion that these were receipts within the meaning of that section (Stamp Act, 1891, section 101). . . . It was not open to the Courts to narrow or whittle down the operation of an Act by seeming considerations of hardship, or business convenience, or the like.

We can only say that this judgment, if upheld—for we understand it is, and rightly, to be appealed against—will undoubtedly be productive of hardship and inconvenience, and that if it be the law, the law or its framer is, in the historic phrase, "a hass." For we are quite certain that it was never intended that the acknowledgment of the passing of money from one man to another in the same employment should be liable to duty. The individual men are merely members of one corporate body; and there is in such cases no question of the discharge of the indebtedness of one body to another. And we are sure also that it was only receipts for the discharge of such debts as could be sued for at law—and a servant can only be charged with larceny or embezzlement, he cannot be sued, in a civil action, for the recovery of money which is not his to pay, but is the property of his master—that were intended to be taxed. The wording of the section referred to is as follows:

> For the purpose of this Act, the expression "receipt" includes any note, memorandum, or writing whereby any money amounting to two pounds or upwards, or any bill of exchange or promissory note for money amounting to two pounds or upwards, is acknowledged or expressed to have been received or deposited or paid, or whereby any debt or demand, or any part of a debt or demand, of the amount of two pounds or upwards, is acknowledged to have been settled, satisfied, or discharged, or which signifies or implies any such acknowledgment, and whether the same is or is not signed with the name of any person.

Undoubtedly the meshes of the net are woven pretty closely; but we await with considerable confidence the result of the appeal.

Manchester District Institution of Gas Engineers.—The 118th quarterly meeting of the Institution will be held, as previously indicated, at Kendal, next Saturday. As usual at the spring gathering, the day will be mainly devoted to pleasure; but we learn from the programme issued by the Hon. Secretary (Mr. S. S. Mellor, of Northwich) that Mr. R. G. Shadbolt, the President, will have a little business to conduct, consisting chiefly in increasing the numerical strength of the Institution by the admission of three new members. It has been arranged to reach Kendal at half-past twelve; and shortly afterwards the party will partake of luncheon in the Town Hall, on the invitation of the Mayor and Corporation. In the afternoon, a visit will be paid to the Corporation Gas-Works, a description of which will be given by Mr. T. N. Ritson, the Gas and Water Engineer. After inspecting the works, the members will drive to the Fisher Tarn reservoir of the water-works. On the return to Kendal, tea will be served in the Town Hall.

An Acetylene Reflector.—According to the Berlin correspondent of the "Standard," Lieutenant von Kries has designed an acetylene reflector, intended especially to serve for searching for the wounded on the battle-field. It consists of an acetylene developer borne on the soldier's back, and the reflector itself, which is fixed to a detachable stand—the two portions being connected by metal tubing. The developer is filled with about 1 kilo. of calcium carbide, and it is stated to give out a light of 50 or 60 normal candle power, lasting about eight hours. By means of a special arrangement of parabolic magnifiers, the candle power is doubled. It is reported that the developer is not liable to explode; and it is self-regulating. Our contemporary's correspondent questions whether the reflector could be really utilized in warfare, as it is doubtful whether enough calcium carbide could be taken to replenish it; and he points out, moreover, that the most simply constructed acetylene lamps require a certain amount of technical dexterity,

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 1443.)

Business on the Stock Exchange was extremely quiet during the past week; and, except in a few instances, the movements in prices were unimportant. On the resumption of business after the holidays, a strong tone prevailed; and prices were inclined to advance. But speculators who bought before Whitsuntide took advantage of the firmness to secure profits; and towards the end of the week, distinct weakness prevailed. Much of the selling has been doubtless prompted by the fears of dearer money; for discount rates have been steadily hardening all through the week. The Money Market has been getting into a nervous state, owing to the fact that the Bank of England is unable to replenish its stock of gold, as the Continental demand takes all precious metal which is offering. With several new loans pending, brokers are gradually working discount rates up towards the official minimum of the Bank of England. All first-class active investment stocks have naturally been affected by this; and Consols have dropped to 109$\frac{13}{16}$ for money and the June account, which is the lowest price quoted this year. The Gas Market has shared in the inactivity of other departments, and has been under the influence of the holidays. Only seven changes are recorded; but these are mostly in the upward direction. Continental Union rose three points, Imperial Continental one, while Oriental and Ottoman issues are also fractionally better. On the other hand, Buenos Ayres and Monte Video are quoted lower. So far as the London and Provincial Companies' stocks are concerned, there have been no changes on the week, though some business has been done in Gaslight, South Metropolitan, and British. As regards Water Companies' securities, they have been even more stagnant than those of the Gas Companies; but dealings are reported in Southwark and Vauxhall ordinary at 216$\frac{1}{2}$, and Grand Junction "C" at 52$\frac{7}{8}$.

With regard to the daily operations, there were no changes on Wednesday; but on Thursday Oriental old and new improved $\frac{1}{4}$, while on Friday Continental Union rose 3, and Monte Video declined $\frac{1}{2}$.

ELECTRIC LIGHTING MEMORANDA.

The Re-appearance of the Electric Cab—The Finances of the City of London Company—The Question of Valuation—The Accounts of the St. Pancras Vestry Undertaking.

Some time ago, when the electric cabs were taken off the streets of London, we ventured to hint in this column that there was not much hope of their re-appearance upon the scene of their partial triumphs. It is only fair, therefore, that we should record the interesting fact that these curious conveyances actually did return to the Metropolitan thoroughfares last week. It is reported in an electrical journal that the London Electrical Cab Company succeeded in placing eighty of their new pattern cabs upon the streets on Wednesday morning. We must take our contemporary's word for it, because this number of vehicles would not make much show among the tens of thousands of Metropolitan stage carriages licensed by the police to ply for hire. It so happened, however, that two or three of these "conveniences" were seen on their winding way, and their generally shabby, second-hand aspect was most noticeable. They seemed to have spent their enforced vacation in some damp place. It was considerate of the Company to let the Whitsuntide holiday pass before placing their cabs at the disposal of the British public, because otherwise some rash persons might have engaged them for trips out of town; and this would probably have been too much strain upon their delicate constitutions. For the electric cab has succeeded to the boast of the well-known minstrel troupe, and "never performs out of London." Unfortunately, some of its performances in London on the day of re-opening were such as could have been omitted from the programme with advantage. One cab went wrong in Fleet Street, colliding with a "trap," and damaging its own tyre. On Ludgate Hill, another cab "became unmanageable"—a nice place for such a condition to declare itself!—ran into an omnibus, and shook up things generally. Several other electric cabs celebrated their return to business in a similar fashion. It may be remembered that they were taken off because they were not strong enough for their work; now the opposite quality appears to be the source of trouble.

Something appears to be going wrong with the City of London Electric Lighting Company, to judge from the market quotations for its shares. The price of the ordinary shares, upon which a 6 per cent. dividend was paid for last year, has fallen to 16. Last year, when the dividend was marked 10 per cent., the same shares touched 30$\frac{3}{4}$. Even now the investment would only yield a fraction over 3$\frac{1}{2}$ per cent. to a buyer, which is absurd for such a property. It is observed by the Stock Exchange correspondent of an electrical contemporary, that probably the downward course of the market is meeting with approval from the civic authorities. "To buy up the Company to-day would be a very different thing to the same operation a few months ago, when the price of Citys was over 24, or in its

palmiest days last year, when 30¾ was at one time reached. The fall from the highest quotation of even this year means a considerable prospective saving to the ratepayers; and there are not wanting those who urge that the Corporation should absorb the Company while the price of the shares is comparatively low." Rarely has the vulgar error with regard to the method of valuing a statutory supply undertaking for transfer to a Local Authority been more artlessly perpetrated. The remarks illustrate a passage of certain proceedings before a Parliamentary Committee, when somebody ventured to mention the market value of the stock of the undertaking which was being dealt with in this respect. "That," said Counsel on one side, "is never considered in an arbitration for ascertaining the transfer value." "True," was the reply on the other side, "but it is always mentioned."

It is impossible to say what might be the course of an arbitration to determine the transfer value of the undertaking of the City of London Electric Lighting Company to the Corporation; but if precedents were followed, the amount would be calculated upon the net maintainable revenue as the fundamental datum, not upon the market value of the shares in any particular week. It might be argued that the court of arbitration and the market operators really work upon the same lines, and arrive at conclusions which differ from one another only in degree. This is true enough in the main; but the distinction between the methods of appraisement followed in the two cases is capable of being referred to a ruling principle. If a market operator were to value an electricity supply undertaking according to the system followed by an arbitrator for transfer, he might arrive at a price for the shares greater or less than that quoted for the time being on the Stock Exchange. For instance, it would be difficult to justify, by rule, such a price for an Electric Lighting Company's ordinary shares as will only return 2¾ or 3 per cent. on the investment. It is hard to credit any such property as worth this exorbitant price. There may not be anything else in which to put the money; but this consideration has nothing to do with the intrinsic value of the property in question. There is a real danger in the actual cheapness of money for investment; and it is a good thing for Local Authorities contemplating the purchase of various kinds of reproductive undertakings, that they are not bound to regard this element of value.

The accounts of the St. Pancras Vestry electric lighting undertaking for the past year's working are analyzed in this week's "Electrician." We are glad to see the particulars; the undertaking in question being a typical one in many respects, as well as one of the oldest of its kind. The supply began in November, 1891. It is unnecessary to repeat the tale of the wonders this Vestry enterprise was going to exhibit, both as a money-making business and a solution of the problem of making the destruction of dust a source of cheap electricity. The capital sunk in the venture now amounts to just £185,000, on which a working profit of 6·04 per cent. is shown for the year. Out of this 4·2 per cent. was required for interest on loans and sinking fund, leaving a balance out of which £4000, or 1·77 per cent., was graciously carried to the depreciation fund, making this reserve up to the magnificent total of £8000. Let even this be credited to the St. Pancras Electricity Supply Committee for righteousness. Our contemporary regrets that the past year's working of the stations did not maintain the improvement shown in the previous year's returns; but matters have probably settled down upon their bearings. The Vestry are heroically helping the concern by increasing the public lighting account, which now stands at £6000 a year, or one-fifth of the revenue from private consumers. This is a noble sacrifice of Peter in the interest of Paul. The Vestry pay themselves £30 6s. 5d. per arc lamp per annum. If the business is not profitable at this rate, it is not the fault of the authorities. The expected benefits of dust destruction in combination with electric lighting are not conspicuously realized. On the whole, the St. Pancras Vestry appear to be at about the high-water mark of prosperity in respect of their electric lighting affairs. The encouragement of the finances out of the rates cannot go much farther. The point of saturation of the district for private lighting is approaching; and the time for husbanding the profits has arrived.

WORKMEN'S BENEFIT SOCIETIES.

[Second Article.]

Employers' versus Friendly Societies.

One of the first impressions derived from a perusal of the evidence tendered on behalf of the Employers' Societies is that the witnesses obviously fought shy of arguing the question of Employers *v.* Friendly Societies. While contending, with certain reservations, that masters have good grounds for making it compulsory rather than optional for their men to join their Clubs, they seemed anxious to avoid giving any reasons why those masters should prefer the men joining their Clubs in particular rather than any of the public Friendly Societies. They were evidently conscious of the fact that a desire on the part of the employers to promote thriftiness among their employees, and to aid providence by benevolence, does not sufficiently (if at all) account for this preference. We think this apparent reluctance to seize the opportunity presented of stating the case for such Societies, is to be regretted; for there are many very sound and legitimate arguments to be urged in support of such preference on the part of employers.

The first—and, indeed, the strongest—of these arguments is the good feeling and friendly relations which are established between master and man, when the former institutes and liberally supports, and the latter subscribes to, and benefits by, a properly constituted and managed Society. This, we are well aware, is an argument which some agitators of the worthless sort (and we are by no means of those to whom all so-called "agitators" are anathema, for agitation is the father of all progress) strive to meet, and to construe into a grievance, by pretending to discover therein a sinister attempt on the part of capitalists to bind men to their service under the pretence of encouraging thrift. But we think those employers the wisest who take this bull by the horns, and are not afraid to urge upon their men the truth, too little recognized in these days, that friendly relations conduce to the advantage of both men and masters, and are fully compatible with such a measure of independence as is possible or desirable under the conditions of commercial life. We may here remark that it is the misguided notion that complete independence is a possible possession of both or of either of two parties who are mutually dependent upon one another for prosperity, or even for livelihood, that is the direct cause of so many misunderstandings and conflicts between employers and employed.

In the labour world, as in the political and economical worlds, it is a common, but entirely fallacious, idea that what benefits one person must, *ipso facto*, injure another. We see it daily assumed as an axiom in argument that that which conduces to the prosperity of one country must needs be detrimental to the advancement of another; and the same fallacy—as mischievous as it is common—underlies the widely preached and accepted idea that masters only become prosperous at the expense of the well-being and interests of their men. To again quote Mr. Brabrook (whose views on labour questions are, in our opinion, of the sanest)—

> It is not to be supposed that the relations between employers and employed are relations of chronic hostility. They have their diverging interests, as all persons who have dealings together must necessarily have; but they have a common interest, which is often stronger than the tendencies to divergence. Where these common interests lead them to join in arrangements by which the workmen and employers contribute together to a provident fund, the results have been excellent in the establishment of mutual confidence and good feeling between them. This has been shown to a marked extent by unanimous applications on the part of the workmen in certain industries for certificates to schemes (for contracting-out under the Workmen's Compensation Act) in which the benefits provided have been shown upon inquiry not to be equal to those of the Act, and the contribution of the employers not to be equal to that of the workmen. *They have felt that the indirect advantages of maintaining the existing amicable relations and avoiding litigation were so great that they would have been glad to waive the advantages they might derive from the Act.* This is, obviously, not practicable; and when the necessity of increasing their contributions to the joint fund has been pointed out to the employers, it has been cheerfully accepted—a circumstance which leads to the hope and confident expectation that the provision for contracting-out may tend greatly to promote industrial peace and welfare.

What better testimony or stronger arguments could be produced to persuade men and masters that an attitude of mutual suspicion and distrust is inimical to the interests of both?

We have put in the forefront and emphasized this argument, in favour of the institution of benefit societies in connection with commercial undertakings, because we are certain that, unless the employers who support, and the workmen who join, them do so with a clear understanding of the objects for which they are founded, and of the mutually beneficial ends they serve, and unless all idea of charity upon the one hand, and obligation upon the other, be absent, the result of their institution will almost certainly be the creation in the minds of the men of a smouldering, undefined, and unspoken, but none the less dangerous, suspicion as to the good faith of the masters. This will, of course, be especially the case when membership is made a condition of employment.

It may be considered that we have laid too great a stress upon the advantages accruing to the employer from the existence of such Societies for the benefit of his men; but we have thought it necessary, in view of the signs of a tendency in some quarters to look upon the new burdens imposed by the Workmen's Compensation Act as a reason for reconsidering—in a manner unfavourable to the men—the relations existing between masters and men in respect of Works' Benefit Clubs, to try to bring home to the minds of employers the fact that they are not, by supporting such institutions, entitled to pride themselves upon being generous or liberal to their men. They are at the most entitled to the credit of sagacity; for generosity consists in giving something for nothing, whereas we have striven to show that contributions in aid of workmen's benefit societies are in the nature of a sound investment, paying a high rate of dividend in the resulting confidence and good-will of the men. Employers only lay themselves open to the accusation of talking cant when, in speaking of Benefit Societies, profit-sharing schemes, the eight-hour day, or any other boon they may be granting or may have granted to their workmen, they ascribe to themselves purely altruistic motives. It is a great mistake, but more common than might be supposed, to imagine that the working-man, of whatever other errors he may be guilty, is such a fool as to believe that any business is conducted upon philanthropic principles. He is particularly careful never to work

on those lines himself, and does not expect, or believe, that anyone else will do so. The employer who thinks that he can disarm criticism by so-called "benevolence," and who attempts to presume thereon to the extent of imposing unfair conditions of service in other respects, will sooner or later be rudely undeceived. Moreover, it must not be forgotten that our argument is that the advantage is a mutual one, and that the wise master, while refraining from pluming himself upon his liberality, will put it plainly to his men that a considerate master deserves faithful service; that faithful service means a prosperous business; and that, other things being equal, it is more to their advantage to serve a flourishing than an unsuccessful employer.

There are, besides, other advantages accruing directly to the men from their membership of a Club connected with their employment. The most obvious of these advantages is, of course, the pecuniary saving or benefit to the men derived from the employer's contribution to their Club. This contribution usually takes the form either of direct financial assistance or of partial, if not total, relief from management and office expenses —sometimes, even, including assistance in both directions—and results in lower rates of contributions being required from, or greater benefits being assured to, the members than would otherwise be possible. The proportion of the income provided or expenditure borne by the employer, naturally varies considerably; and it is, or should be, to a certain extent governed by the character of the work on which the men are employed—the proportion being greater where the conditions of labour are most prejudicial to health. It is, further, a very distinct gain to the members of a Shop Club that such membership tends to give them a more certain tenure of their situation than they would otherwise have in the event of temporary disablement from work through sickness. A workman who is laid by on a sick bed for perhaps several weeks, will, if he have no such connecting link with his employment, not unlikely find, when he is sufficiently recovered to return to work, that his berth has been permanently filled up; whereas it is a practically invariable custom for an employer to keep vacant the situation of any man belonging to his Club who may fall sick, until he is once more able to perform his duties.

Another advantage derived from the institution of a regular provident fund on a works is that it does away with all excuse for the appeals, *ad misericordiam*, for aid in case of sickness, which are otherwise constantly made by thriftless men, both to their employers and to the more saving of their fellow workmen. This advantage is, in fact, a mutual one. The employer, by founding and supporting such a fund, discharges any moral obligation he may—and should—feel to assist his men in sickness, with the further advantage to him that he then knows the extent of his commitments; while, at the same time, the existence of such a Club, if membership be not compulsory, enables the provident men to reject the demands of the thriftless, on the ground that they will not help those who have refused the opportunity of helping themselves. Where membership is obligatory, sending the hat round is unknown, except in cases where special circumstances have created special need. It is a further argument in favour of these necessarily limited Societies, that they possess—what large Friendly Societies too often lack, and suffer from the want of—the element of personal knowledge by the members of each other. This of itself is one of the greatest safeguards against fraud.

Slate Clubs.

We have, so far, been assuming that the only alternative to a Shop Club is one of the well-known and permanent Friendly Societies; but the case in favour of the former becomes much stronger when it is considered that many men would, were there no Club connected with their works, be content with joining a Slate Club, or some similar form of Dividing Society. The unsatisfactory character of the Slate Club as an insurance against sickness need scarcely be argued, we should have thought; and yet to our astonishment we find Mr. Brabrook asserting that such Societies "conduce to the interest of their members." It is true he afterwards very clearly sets out the "obvious disadvantages" of these Societies, in these words: "So long as it continues a law of Nature that the liability to sickness and death increases with age, so long a Club that wipes off the slate each year the transactions of the year will find the increase of age of its members a disadvantage. The younger men will refuse to join when they find that the Club contains an undue proportion of older men. The older men will find the burden too heavy, if there are no younger ones to share it with them. Pleasant, therefore, as the annual dividend may be, and attractive as the working of a 'Tontine' may be during its earlier years, it is not to be looked upon as a permanent provision; and the wise workman will not waste his dividend, but will so apply it as to form a provision for the time when the Slate Club ceases to be available."

Had this warning against any man placing much reliance on such Clubs as his sole assurance against sickness stood unqualified, we should have merely added our own opinion that the disadvantages enumerated are, in themselves, sufficient to render membership of them inadvisable, as tending to neglect of more reliable, if less superficially attractive, forms of providence. But we feel bound to challenge Mr. Brabrook's attitude towards these Societies, when we find one whose opinion in such matters is calculated to carry weight with the public stating that Dividing Societies "possess the advantage that, as a member gets back his surplus payments at the end of the year, he is willing to pay more than the member of a Society which looks forward only to the dim and distant future." What advantage, we would ask, is accrued from a man's subscribing a larger sum, if at the end of the year none of the amount is necessarily (and there is certainly no sort of guarantee that any of it will be) set aside as an assurance against the needs of that dim and distant future for which it is so needful that a man should provide? He proceeds: "They have also the advantage that they frankly provide only for such sickness and death as may occur in the course of the current year. There is no affectation of providing for old age, either directly or indirectly. If the members feel it their duty to provide for old age, they know they must go elsewhere to do so. There is no pretence that they thought their Slate Club would do it for them." But is it certain they do know the one, and do not think the other? Mr. Brabrook himself, without apparent intention, supplies the answer—"Statesmen have moved on several occasions for returns of the number of paupers in workhouses who have been members of Friendly Societies. Such returns have always been misleading, because they have included those who have been members of Dividing Societies!" Is Mr. Brabrook only elaborately sarcastic when speaking of this form of Society conducing to the interests of its members?

It is just because working-men so frequently do not clearly recognize that these Societies are no provision against old age, and are accordingly led into making it their sole form of providence, until they find themselves at an age when their Slate Club fails them and they are too old to be admitted to the other Society they ought to have joined twenty years before, and it is just because of the enticing advantage of the annual dividend (which is more often than not spent in the ale-house) that Slate Clubs have been, and are, the curse of many a family. The writer was present not long since at a working men's debate on Slate Clubs and Friendly Societies, and was struck by the earnest and emphatic condemnation of the former by men who had themselves (or whose relatives had) been stranded in old age by the sinking of the Club to which they had for years subscribed. Mr. Brabrook's answer to such arguments appears to be that if a man wants to be a fool, let him—that is his own look out. For he prefaces his plea for the recognition of these Societies by the following extraordinary argument: "When Societies of a particular form are established in great number in many parts of the country, without regarding whether the form is one prescribed or encouraged by law, it is to be inferred that there is something in that form of Society which especially meets the wishes, and conduces to the interests of, its members; and the wise legislator will inquire whether his own views are not too narrow, and whether there may not be something in the form of Society which deserves the encouragement of the law. It seems a common mistake on the part of legislators that it is within their province to find out for the people that which is for their good and that which is not—to encourage them to follow the former, and to devise brave punishments for those who persist in following the latter."

There does indeed exist, we may observe in passing, an impression, so common as to be almost universal, that Parliament is elected in order to enact that which shall be for the electors' good. But Mr. Brabrook assures us that "this is an absolute error. The province of the Legislature is to find out what contracts people desire to enter into, and, when they have entered into them, to see that they fulfil them; not to tell them what contracts they ought to enter into, and what contracts they ought not to enter into. The administrators of the law" may not be going beyond their province in offering such advice and guidance as experience may have shown to be useful; but, in general, people are the best judges of their own affairs. . . . Hence the circumstance that Dividing Societies are popular, leads to the conclusion that it is not without reason that they are so." If this means anything, it implies "not without good reason;" and so, in the same way, we suppose the writer would argue in favour of the "encouragement" by law of public-houses or gambling hells!

We can only ask Mr. Brabrook if he proposes, or would support, the repeal of the Truck and Factory Acts; for his line of argument leads direct to such a conclusion. We have never been zealous advocates of grandmotherly legislation, but are certainly startled at the suggestion that, if only a sufficient number of people wish to embark upon a foolish undertaking, that is a good reason for extending to their enterprise the encouragement of the law. It is indeed often impossible or impolitic to prohibit, but we should have thought it was never advisable to encourage popular acts of folly.

The Archimedean Principle for Gases.—We learn from "Nature" that a simple verification of the principle of Archimedes gases is described by M. Métral in the "Journal de Physique" for April. Two flasks, each of 1 litre capacity, are suspended from the scale pan of a balance. On placing the lower one in a vessel filled with carbon dioxide, the equilibrium is destroyed, but is restored again on filling the upper one with the same gas. To verify the principle for gases lighter than air, the two equal vessels are attached neck downwards by clamps to a horizontal beam suspended from a balance scale pan. On lowering an inverted jar of hydrogen over one vessel, equilibrium is broken, but is restored by filling the second vessel with hydrogen.

AËRIAL SANITATION—THE IDEAL DWELLING HOUSE.

An interesting article on "Ventilation," by Professor R. H. Smith, appeared in the "Engineer" for the 5th inst. This essay brings the science of the matter up to date; and its observations and suggestions constitute a useful extension of our recent discussion of the general subject (see *ante*, p. 854). The holders of the Chairs of Natural Philosophy and Applied Mechanical Science at our Universities perform a public duty of the highest service to the community when, as happens only too infrequently, they thus deign to make use of the public journals for giving "the time of day" for their particular domain. The importance of the study of ventilation systems is great, and increasing with the growing tendency of the population to close packing in their habitations and places of public resort. Looking out upon the world from the 'vantage point of his Chair in the Mason College, Birmingham, Professor Smith notes with satisfaction that "the trained professional architect has at least reached the stage of knowing that it (ventilation) is one of the most complex and difficult subjects to deal with practically that exists, and thereby shows that he is ahead of the average engineer, who usually imagines that it is as easy and simple as the opening and shutting of windows." It is perhaps as well to remark here that Mr. W. N. Shaw has by no means given up the common sash window as an aid to the ventilation of interiors.

Professor Smith touches upon a highly important order of considerations when he remarks that "it does not seem to be recognized that really efficient ventilation may, and ought to, become an important factor in economy of cost in building construction. There can be no doubt that it is healthier to sleep in a very small bedroom perfectly ventilated, than in a very large one without ventilation." Space, in modern houses, is a costly thing; and a very questionable convention has made the two expressions "spacious" and "airy" synonymous when applied to interiors. The two ideas, however, are not by any means the same; for generally the spacious headroom of a modern bed or sitting room is a vault of foul exhalations. Again, the popular error in this regard has been encouraged by the common sanitary rules and regulations requiring the allowance of so many cubic feet of space per occupant. If, as Professor Smith says, we were familiarized instead with the idea that "proper ventilation consists in steady change of air," instead of the current notion that it may be simple retardation of the rate of pollution of a stationary mass of air, these so-called sanitary regulations would soon be fundamentally modified. Here, at last, upon unexceptionable authority, we find the long waited-for exposure of the vulgar error that incandescent electric lamps are necessarily more conducive to health than any light of combustion, by reason of their not "polluting" the air. We have denounced this false pretension of the partisans of electric lighting from the period when it became a commonplace of their press and platform; only, of course, to find it repeated over and over again whenever occasion served. Professor Smith is to be thanked for his simple and convincing definition of what constitutes proper ventilation—a definition which leaves nothing to be desired. He drives the lesson further home with the observation that "except for the architectural magnificence of high walls and ceilings, which some people do not like in a living room . . . high ceilings mean neither more nor less than the provision of aërial cesspools." Having definitely passed the cesspool age of sanitation in respect of sewerage and water supply, it is time we followed the same way of progress in aërial sanitation; getting rid, by a continuous and immediate operation of removal, of the polluted gaseous matter from our living rooms.

This is the desideratum; the next thing is to find out how to secure it. Professor Smith begins this inquiry apparently at the wrong end—by considering the case of large public halls provided with special ventilating arrangements, thence working down to the requirements of a dwelling house. There is reason, however, in this order of treatment of a difficult subject, inasmuch as the course of mechanical advance is invariably from the complex to the simple. Plenum warm air ventilation was put into the Mason College when it was built, in 1880. The system consisted of a large air-chamber, heated by hot-water pipes, placed in the centre of the basement, with main ducts leading off on two sides, whence ramifying ducts were taken to the rooms. There was no mechanical propulsion of the inflow; the inlets were almost on the same level as the bottom of the outlets; and the latter only rose a few feet before they were joined to a long horizontal duct. The system was a failure. The inlets and outlets persistently exchanged offices, and the warmed air as often as not went anywhere rather than in the desired direction. A fan feeding into the heating-chamber was added later; but this, while it improved the circulation, did not render the arrangement satisfactory.

Some years ago the Birmingham Town Hall was provided with "fan plenum" ventilation; the air passing over an ample stack of hot pipes in the chamber. Under the gallery, the air inlets were 8 feet from the ground. In the orchestra, it entered through holes in the vertical boardings between one seat and the next higher. "This caused cramp in the calves of the public who sat there, and was discontinued in obedience to popular demand. Rows of gaslights were still required along the sills of the windows to prevent cold draughts down the large glass surfaces." Although better than before the alteration, the condition of the hall "still causes discomfort." The chief mistake committed in both these examples seems to be that the distribution of the air in all the required ramifications was expected to be automatic. There were no means of regulating the discharge from any duct, nor of preventing back-draught.

Professor Smith lays it down that the key-note of efficiency, for any system of ventilation, is remembrance of the extremely small specific mass of air, in consequence of which it requires only a minutely small pressure gradient or difference to direct a current of high velocity one way or the other. The rapid small changes of local pressure in the atmosphere outside a building—quite different on one side of the building to those simultaneously occurring on the other side—are sufficient to upset elaborate ventilation systems. This observation applies equally to extraction and plenum systems. The conclusion forced upon Professor Smith's mind is that for large buildings it is a mistake to depend for the creation of a proper air circulation upon one originating power. He holds that the artificial draught power should be freely subdivided in a degree proportioned to the magnitude and complexity of the system. If mechanical draught-power be used, electrically-driven fans seem to be the only available resource capable of a sufficient degree of subdivision. But "for working by extraction, bunsen gas-burners, placed at least 2 feet or 3 feet above the base of each sub-upcast, and well protected overhead from being blown out by exceptional gusty down-draught, would probably be cheaper, if not more efficient. Such gas-jets could be more conveniently and cheaply applied to each living and bed room of an ordinary house than could electric fans." Professor Smith does not forget that an air-extraction shaft placed alongside an ordinary chimney, is kept sufficiently warm to maintain a steady up-current. As for flap back-draught checks (presumably for outlets into smoke shafts), he suggests that efficient and cheap flaps could be made of paper set in a frame of thin sheet brass and falling on wash-leather or felt seats.

Professor Smith mentions the division of opinion among ventilation experts respecting the comparative merits of floor and ceiling level extraction (see "Notes," *ante* p. 1108). He points out that respired air, notwithstanding its load of carbonic acid, is always lighter than the fresh air required for breathing, and consequently ascends. It is the same with the products of all combustion. It must therefore be correct to extract it from the ceiling level, or thereabouts. It occurs to us to draw attention here to the prime importance of not permitting this rising foul, warm air to become chilled by striking against a cold ceiling, or so-called open roof of a church or public hall. If this happens, the chilled exhalations pour down upon the heads of the people below, with the most distressing results. The great St. James's Hall, London, has one of these "waggon" or open roofs; and consequently, notwithstanding its provision of a row of gigantic ridge "ventilators," the unfortunate occupants of the back seats in the side galleries may be observed on cold nights sitting wrapped up to the eyes in furs and great coats. This is supposed to be on account of the "draught;" but there are no side windows, and the chilling current comes from the roof. Being composed of air that has already been breathed, possibly several times over, the nature of the atmosphere may easily be imagined. A row of gas-burners at the springing of the roof would go far to correct this defect.

Professor Smith concludes that the only ideally perfect ventilation consists in inducing a regular up-current from a level below that of the human head to extraction outlets at the ceiling. The mechanical difficulties of regulating and distributing the fresh air supply over the area of the room, without discomfort to its occupants, are admittedly great; but perfect rational ventilation will not be accomplished until these are overcome. This is a hard saying; but it is the truth. As to ordinary living rooms with open fires at the level of the floor, Professor Smith thinks it impossible to effect really good ventilation under such conditions. There is a remarkable agreement of opinion upon this head among those who have studied the subject; but it seems hopeless to expect any direct alteration of this feature of the British dwelling house. Indirectly, it is possible that the gas-fire may become instrumental, in good hands, in correcting the worst defect of the British hearth. Professor Smith thinks it strange that the vigorous ventilating power of the gas-jets burnt for lighting is so seldom utilized; but that, as the saying goes, is "another story."

Incidentally, Professor Smith draws attention to the instructive historical fact that the hot-air system of house warming, once so popular in America, is gradually being discarded in favour of hot-water pipe and other "radiator" warming. It is, in fact, impossible that the human body should absorb heat from the air in which it is immersed unless this air is oppressively hot. Nothing under 100° Fahr. will serve the purpose; but this means a Turkish bath, and the accompanying abandonment of clothing. The only real benefit derivable from warming the air brought into rooms and public halls is the prevention of chills. A most important truth, mentioned almost casually by Professor Smith, is that the human body seldom requires actual warming by absorption of heat from outside, except as compensation for unusual chilling influences. The obvious inference is that where such chilling influences—cold currents of air, cold walls and solid objects surrounding one—do not exist, "fires" will be rarely needed, at any rate in temperate climates.

This discovery leads Professor Smith to the suggestion of a new and "most economical and most efficient plan of warming and ventilation," consisting in placing a solid warming radiator in the centre of the room, in the form of a flat or ribbed horizontal plate suspended near the ceiling—which would be made fireproof in its neighbourhood. This radiator would be heated by blue-flame gas-jets, preferably of cheap heating gas, arranged underneath it. The heated products of combustion would spread over the ceiling and escape by outlets arranged in the four walls close by the ceiling, these leading into chimneys. "In the neighbourhood of the ceiling, this horizontal radiating current would be joined by up currents from the lower strata of the room, carrying off with them the aërial excreta from the human lungs and perspiration glands. At night a part of the heat of the gas-jets would be used to produce light by the incandescence of suitable so-called mantles. The income of fresh air might be from perforations all along a pipe running round the room at the top of a 3 feet high dado." Such is the Professor's idea of an improved warming and lighting system.

It would scarcely be respectful to dismiss this plan as being merely academic; while it would be an excessive compliment to describe it as brimming over with actuality. Would it be rude to ask if anything of the kind has ever been tried? For the present, we prefer to rest in the non-committal position of admitting that the country may come to this sort of arrangement eventually; while acknowledging that the idea seems rather heroic for present practice. We are persuaded, notwithstanding, that something might be done, upon the lines indicated by Professor Smith, to compass the desiderata of cheap house ventilation and the reduction of the labour of domestic service. Let the height of rooms be reduced to 9 feet or less; and all walls and ceilings be panelled inside to reduce heat-conduction. Let the dimensions of windows be diminished to the requirements of sufficient lighting—they would extend to the ceilings. Abolish all open chimneys and fire-places; substituting gas-fires with proper and sufficient flues. Provide extraction shafts; and arrange for air admission by the windows. Cook by gas alone; but the kitchen to have the only open fire in the house, in connection with a circulating boiler powerful enough to supply a bath, washing-up water, and a hot-water circulating system serving radiators in the hall, in front of the windows of all the rooms, and in the corridor on the first floor. The hot-water heating system to be controlled by valves. In such a house, the chill being corrected by the hot-water radiators, the gas-fires would only be needed for a few of the very coldest days of the year. Housewifely labour would be reduced to the minimum, while comfort and health would be increased.

OBITUARY.

The death is announced, after a long illness, of Mr. JOHN HARGREAVES, J.P., the Chairman of the Rossendale Union Gas Company. On the incorporation of Bacup, in 1882, Mr. Hargreaves was chosen as the first Mayor of the borough. He held the office for two years, and was afterwards appointed a County Magistrate. He was an Alderman of the borough for six years, and later on a member of the Lancashire County Council for three years.

PERSONAL.

Mr. T. D. OVERING, foreman at the Rotherham Gas-Works, has obtained the appointment of Gas and Water Works Manager to the Birstall District Council, in succession to Mr. F. Key.

Mr. P. B. WATSON, the Manager of the Castle Douglas Gas Company, was last Wednesday presented with a handsome liquor cabinet by his friends, on the eve of his departure to fill a similar position in Stranraer.

Subject to the approval of a general meeting of the Council, to be held next Thursday, the Longton Town Gas Committee have appointed Mr. W. LANGFORD, of Bath, Manager of the gas-works, and Mr. WALTER DONALDSON, of Longport, Secretary and Cashier.

Mr. JOSEPH RADCLIFFE, Engineer of the Todmorden Water-Works, has resigned the position, having obtained an appointment under the Manchester Corporation. He has had charge of the Todmorden works (which were recently transferred to the Rochdale Corporation) for about twelve years; and a considerable part was constructed under his direct control.

Royal Institution of Great Britain.—The centenary of the Institution will be celebrated on the 5th, 6th, and 7th prox. In commemoration of the event, a number of eminent scientific men have been elected honorary members, among them being the following, whose names have of late years been more or less before our readers: Professor H. Moissan, of Paris, whose researches in connection with the electric furnace have been frequently alluded to; Professor W. Nernst, of Gottingen, whose electric incandescent lamp has lately made something of a sensation; Dr. E. Solvay, of Brussels, well known in connection with the Semet-Solvay oven and his chemical manufacturing processes; and Professor J. L. G. Violle, of Paris, who introduced the platinum standard of light.

NOTES.

An American Photometer.

The photometer difficulty appears to be as troublesome in the United States as in other parts of the world. The "Committee on Science and the Arts" of the Franklin Institute, at the instigation of Professor A. J. Rowland, of the Drexel Institute, Philadelphia, have taken cognizance of a photometer made by the Newark Ornamental Sign and Iron Works, New Jersey. This is described as a portable instrument, on the bunsen grease-spot principle, in which the screen is moveable. Its leading features are a scale reading directly in candle power, an incandescent electric lamp as a known standard, and an oil-lamp as a working secondary or intermediate standard. The purpose for which the photometer is chiefly intended to be used is the measurement of the illuminating power of incandescent electric lamps. In operating the apparatus, the standard incandescent electric lamp is set up in position where the lamps to be tested are afterwards put; and the oil lamp is balanced by it at the other end of the bar. The standard lamp is then changed for the lamps to be tested. It is claimed that by using the oil-lamp in this fashion nearly all the common difficult and tedious processes of photometry are avoided, only one volt meter is required, and only one adjustment of current made. Professor Rowland explains that in his own experience of the use of the instrument, an accuracy of determination of candle power to within $\frac{1}{4}$ candle in 16 candles is readily attainable in a room not specially darkened for the purpose. That is, a single determination will not be more than $\frac{1}{8}$ candle above or below the true value—which is regarded as quite good enough for a commercial photometer. Several points are left unexplained by this description—the most important essential, of the manner in which a standard incandescent electric lamp is obtained, being passed over. If it means a lamp that has been rated to give 16-candle power at the potential available on the spot, the durability of the standard remains doubtful.

The Economy of Hydraulic Power.

Mr. E. B. Ellington, of the London Hydraulic Power Company, has published a statement with the object of disproving the general conclusion so commonly put forward by electricians, that electrical power is in all cases the best for every purpose. He asserts that there is some danger lest the growing popularity of the dynamo may lead to undue depreciation of the value of older systems of power distribution. There is not much fear of this result being immediately realized as regards the gas-engine; but hydraulic power distribution in towns is a different enterprise. It had scarcely become firmly established in London and other large English towns before electricity supply came to challenge its supremacy for certain well-defined applications. Mr. Ellington shows, by reference to the case of London, that hydraulic power or electric power distribution are only two different ways of utilizing the energy of the same fuel. In the one case the fuel is burnt for pumping water, in the other for the driving of a dynamo. Both operations are economical, as mechanical conversions go; the mechanical efficiency being about 90 per cent. But the hydraulic plant can be worked to better advantage, because more continuously, than the electrical machinery. For this and other reasons, Mr. Ellington claims that the London hydraulic power supply, at the normal 750 lbs. pressure, costs for coal somewhere about a third of a penny per (equivalent) electrical unit, whereas the best central station practice in electricity supply is about one-halfpenny per unit. Hence he argues that it would be impossible to substitute an electric power system at the four stations of the London Hydraulic Power Company, and distribute the power over the area covered by the hydraulic mains at the corresponding current, and at a suitable voltage for the general industrial purposes of the districts, without a very large increase in the coal bill over that required for the existing hydraulic supply.

The Possibilities of Liquid Air.

Professor Elihu Thomson, writing in the "Engineering Magazine," expresses himself with guarded optimism respecting the possibilities of liquid air in the Arts and Industries. He does not wish to convey the impression that what may be called possibilities are in his judgment probabilities of the near future, or that any great revolution in engineering methods is likely to be the outcome of the recent laboratory studies of liquid air. Much further study and additional experimental work must be devoted to this fascinating subject before anything more than suggestion can be offered with regard to it. But the open-minded observer cannot forget that the laboratory experiments of one day and generation have in times past and present become the foundations of great industries. It took three-quarters of a century for Davy's electric arc to develop into the beginnings of a commercial arc lighting; and nearly fifty years elapsed after Faraday's brilliant researches in magneto-electricity before dynamos became part of engineering. Who would have supposed, Professor Thomson asks, when ammonia gas was first liquefied by pressure, that before the close of the century companies would be doing business by sending it about in pipes for refrigeration? Yet such is the fact. Professor Thomson takes the case of the availability of some innocuous gas liquefiable at about 100 atmospheres pressure, at temperatures easily and cheaply attained, and at no cost for the gas

itself. There can be no doubt of such an article soon finding enormous application in the storage and recovery of energy. Air is a raw material for such a possible product. In the liquid form, it represents air compressed to about 800 atmospheres, but existing without pressure. The presence of oxygen in the fluid is a source of danger; but Professor Thomson hints that the liquefaction of air may be a cheap way of obtaining pure oxygen for industrial purposes. The suggestion has already been made.

Imperfections in Chemical Lead.

Mr. George E. Davis has brought under the notice of the Manchester Section of the Society of Chemical Industry a matter of considerable importance to all users of "chemical lead," such as is employed in the construction of apparatus intended to resist the action of acid. Chemical lead is a metal of a high degree of purity; but it not infrequently happens that sheets and pipes of this material wear unequally. During recent years complaints have arisen that the lead sheeting of sulphate pans, &c., is not of such good quality as formerly; but Mr. Davis does not think there is much to complain of. A more important consideration is the occasional occurrence of holes in the lead sheets, sometimes in a few hours' working. As the whole of the defective substance, whatever it is, disappears in the making of the holes, leaving the remainder of the sheet perfectly good, Mr. Davis points out how difficult it is to discover the cause of such mischief. After many years of observation, however, he thinks he has arrived at the solution of the problem. By cutting through many pieces of lead, he has discovered the existence of crystalline patches covered with a thin or thick skin of metal of the ordinary character. When the sheet is heated and strained, the skin would be broken through, and then the acid would make short work of the crystals (supposing them to contain oxide), without leaving a trace behind. The logical corollary from this statement is that purchasers of chemical lead should be careful to specify that it should not go into holes under ordinary conditions of working.

The Lighting of Isolated Residences.

The "Engineering Record" has been moved to institute an inquiry as to how country residences, and isolated residential or industrial establishments in general, can best be provided with the means of lighting, in accordance with the most advanced modern practice. A few years ago, a private gas-works would have been found the best solution of the problem; but the erection of private gas-works has gone out of vogue of late, without leaving anything very much better to take its place. Consequently, speaking for the United States—although the observation has a wider application—it is admitted by our contemporary that "the lighting of large suburban residences in localities where neither gas nor electricity from a local supply company is available is a good deal of a problem." In some instances gasoline plants are used, and in others extensive steam machinery for driving dynamos is put down. The gas-engine, however, appears to be the favourite source of power; and it is gratifying to learn from a remark in this connection that the demand for gas-engines in America has grown enormously during the last three or four years. Producer gas is not much used for driving engines, on account of the cost and trouble of the producer. Gasoline is so cheap that its vapour is in very general use for driving engines. As in England, the private electric lighting installation is not regarded as complete without a storage battery. A gasoline engine belted to a dynamo of moderate speed, with switchboard and all connections between dynamo and switchboard, will cost from £200 to £400 for a plant of 100 lights capacity. Gasoline costs delivered about 4d. per gallon. The most striking characteristic of this report is that no other system of artificial lighting for the purpose in question is mentioned. Several firms lay themselves out for doing this class of work; but the advance of modern improvement does not appear to have brought cheaper isolated lighting in its train.

A Liquid Air Producer.

The production of liquid air is a British triumph; and Dr. Hampson does not seem disposed to let the mastery of this interesting manufacture pass out of his hands. His latest improved "self-intensive air liquefier," as made and used by the Brin's Oxygen Company, of London, is described in a recent issue of the "Engineer." The apparatus begins with compressed air, delivered at a pressure of 80 atmospheres or over. This air enters by a small pipe, and expands. In so doing it produces a moderate degree of refrigeration, which is applied to the supply of compressed gas on its way to the expansion point. The cold developed by the first expansion is thus communicated to the on-coming compressed gas, which consequently expands from, and therefore to, a lower temperature than the preceding portion. In the same way, it communicates its own intensified cold to the succeeding portion of compressed gas; and the process of accumulating cold, so to speak, goes on until, if the apparatus is well proportioned and arranged, no other cooling agency is required to liquefy the air. The efficiency of the method accordingly depends upon the disposition and construction of the coils and the chamber forming the interchanger, in which the expanded gas takes up heat from the compressed gas. To make this action as perfect as possible, the conditions required are: Having a large surface of exposure between the compressed and the expanded gases; having little thickness of material between them, and that little of high thermal conductivity; having both the compressed and expanded gas in small masses in close contact with the conducting material; having the total volume of the interchange small, so as to expose little surface for the entrance of external heat; and having the total mass of coils and interchanger, which have to be cooled down with the gas, small, and of little specific heat. Dr. Hampson's apparatus is stated to well fulfil these conditions. It has only one valve, and a single gauge.

An Indicator of the Turbidity of Water.

An interesting paper on the clarification of river waters has been contributed by Mr. Allen Hazen to the Chemical Section of the Franklin Institute, and is published in the Society's "Journal." The author remarks on the importance attached by the public to the bright appearance of drinking water as being almost greater in popular estimation than that of its healthfulness. At any rate, since clear water is only second in importance to wholesome water, this quality is worth securing by every necessary means. The standard of limpidity is distilled water, with which natural waters are compared, usually to the disadvantage of natural waters liable to discolouration by peat or mud. The latter cause of bad colour is more properly spoken of as turbidity, the condition consisting of the presence of suspended matter. This matter may be in extremely small particles. An estimate has assigned to many of them a diameter of not more than one-hundred-thousandth of an inch, or less than one-tenth the dimensions of common water bacteria. Yet these particles, and larger ones, may be present in water to such an extent as to form more than one-thousandth part of its weight. Mr. Hazen describes a simple turbidity test which he adopted some years ago for experimental purposes. It consisted of sticking a pin into a lath and pushing this down into the water as far as the pin could be seen. The depth was the indication of the amount of turbidity. Afterwards a platinum wire 0·04 inch in diameter, was substituted for the pin, and the stick was graduated so that the turbidities could be read off directly. The figures marked on the stick are inversely proportional to their distances from the wire. When the wire could be seen 1 inch below the surface, the turbidity ranked as 1·00; when the wire could be seen at 2 inches, the turbidity was 0·50; at 10 inches, it was 0·10; and so on. Within certain limits, the figures are directly proportional to the quantity of the elements causing the turbidity, inasmuch as mixtures give their anticipated readings. The readings should be made in the open air, preferably in the middle of the day when the light is strongest, but not in direct sunlight. Mr. Hazen says of this method that it has been used in a number of cases, with most satisfactory results. If it lacks something of theoretical accuracy compared with certain more elaborate methods, it makes up for it by its simplicity and general adaptability.

COMMUNICATED ARTICLE.

GAS-ENGINES.

THE NUMBER IN USE AND THEIR APPLICATIONS.

By Bryan Donkin, M.Inst.C.E.

About the end of the year 1896, the writer sent out circulars to most of the gas companies in the United Kingdom, requesting the engineer or superintendent in charge to kindly furnish him with the number of gas-engines working in the village, town, or city of his district. Replies were obtained from 438 companies; and to all these gentlemen he returns his thanks for the information supplied. He thinks a short summary may be interesting to engineers and others; and he adds a list of the number of gas-engines in use in some of the largest towns. It will be seen that a very considerable number of these motors are now working in this country. For industrial purposes, this relatively new power has become a very important agent, especially within the last ten or fifteen years, during which time the workmen in many factories and shops have become accustomed to it. These convenient and useful motors do not require any steam-boiler; and the smaller engines can be started with the greatest ease. Gas-engines were first sold in England on a commercial scale about the year 1877, or only 22 years ago. Most gas companies allow a considerable discount off the price of the gas they supply, when a large quantity is used for power in the daytime. For this and other reasons, there will probably be a still greater demand in future for these motors.

In the subjoined list, one of the chief features is, the large number of very small engines—from 1-man to 1-horse power—used in a great variety of trades. Gas-motors have at the same time increased in size, and many are now made up to 80 and 400 indicated horse power and more. In analyzing the various returns, the following figures may be of interest. In the London districts served by the three large Gas Companies—viz., The Gaslight and Coke, South Metropolitan, and the Commercial Companies—there were at the beginning of 1897 about 4600 gas-engines of all sizes from ½-man to 100-horse power. In the South Metropolitan Company's district alone, 150 ½-horse, 100 1-horse, and 120 2-horse engines were at work. In Paris, where gas is much dearer, there were at the same date about 2300 engines, representing an aggregate of about 1200-horse power.

Birmingham comes next on the list with 1480 engines; Glasgow, 1235; Liverpool, 1050; Manchester, about 1000; Leicester, 571; Sheffield, 517; Bristol, 452; Bradford, 432; Belfast, 347; Nottingham, 300; Halifax, 250; Dublin, 262; and Sunderland, 230. In 50 other smaller towns, from 150 to 200 gas-engines were working; 16 towns use from 100 to 150 engines each; and 37 towns from 50 to 99 engines. In certain other towns and villages not mentioned above, from 1 to 50 engines are running. As a rule, the industrial towns head the list for the number of gas-engines in use; and these motors are largely employed for all varieties of trade purposes.

According to this return, the total number of gas-engines working about January, 1897, in Great Britain, including London, was 25,700. It is interesting to compare this number with that of some of the towns in France and Belgium at the same period—viz., Lyons, 775; Bordeaux, 296; Roubaix, 250; Lille, 207; Rouen, 95; Nice, 88; Fourcoin, 85; Toulouse, 35. In Central Europe, about the end of 1896, there were, according to "Engineering," 15,650 gas-engines working, equal to 52,700 nominal horse power. Up to the end of 1897, the number of gas-engines sold in Germany and other countries was about 32,000.

A list of 65 trades served by these engines in England is added; probably the largest number being used for the production of the electric light. Printing and newspaper work in provincial towns come next. Sausage makers as well as butchers use them largely; and many are employed for blowing organs, for the manufacture of gloves and clothes of all sorts, and for laundry work. In gas-works, small gas-engines are often utilized to furnish power for a variety of purposes, such as breaking coke, pumping, hoisting, &c. In one town in the Midlands, the returns for all trade purposes show an increase of about 50 engines per annum, or an average of one per week. One firm alone employs a total of 400-horse power. The above figures relate only to the engines driven by gas supplied by gas companies.

There are, of course, many villages without either gas-works or gas-engines, and some are provided with gas-works but have no engines. Enough, however, has been said to show that these new and handy motors are evidently appreciated by the industrial public, and every year sees additions to the number in use both in this and other countries, except perhaps in the United States, where there are comparatively few.

It is difficult to apportion the horse power of these engines in percentage to the number at work; but it will not be far wrong to estimate that in England from ½ to 5 nominal horse power represent about 50 per cent. of the total number of motors; from 5 to 10 do., 25 per cent.; from 10 to 20 do., 16 per cent.; from 20 to 50 do., 8 per cent.; from 50 to 100 do. and upwards, 1 per cent. In France, according to Professor Witz, there were in January, 1896, the following small number of gas-engines for producing electric light: Eight stations with a total of 386-horse power driven by poor gas made on the spot; also sixteen stations, with a total of 1622-horse power using town gas.

The following figures show the number of gas-engines made and sold in England and abroad by Messrs. Crossley:—

	Engines.	Total I.H.P.	Size.
In 1877—1st year	133 ..	798 ..	1 to 8 N.H.P.
,, 1878—2nd ,, ...	448 ..	2670	
,, 1879—3rd ,, ...	590 ..	3540	.. Max. 12 to 18 N.H.P.
,, 1880—4th ,, ...	782 ..	4692	
1898—21st ,, ...	2971 ..	44,565 ..	Max. 160 I.H.P.

Equal to about ten per working day, or one per hour.

The total up to the end of 1898 is 33,944 engines from 1 to 160 indicated horse power; giving a total of 436,400 indicated horse power, or for 21 years an average of 1617 gas-engines per annum.

The following are some of the gas-power plants working with Dowson gas: Blackpool, 1 of 950 I.H.P.; 24 others, in different towns, ranging from 870 to 200 I.H.P.; 34 from 190 to 100 I.H.P.; 26 from 90 to 50 I.H.P.; and 38 from 45 to 10 I.H.P., besides a large number of gas plants supplied to all parts of the world.

The number of Otto gas-engines sold from 1877 to 1897, according to Mr. Dowson, is: In Great Britain and Ireland, 31,000 by Messrs. Crossley; in Germany, 17,000 by the Gas Motoren Fabrik, Deutz; in other countries, 15,000—total, 63,000 Otto engines in 20 years.

List of Purposes for which Gas-Engines are Used.

Agricultural implement makers.
Air propelling.
Army clothing.
Artificial flower manufacturers.
Bakers.
Biscuit works.
Blowing fans.
Boot and shoe makers.
Bottle cleaning.
Bread kneading.
Brewers.
Builders.
Cabinet makers.
Cartridge makers.
Centrifugal fans.
Chaff cutting.
Clock makers.
Coach builders.
Coke breaking.
Contractors.
Corn crushing.
Corn merchants.
Cycle works.
Dairy work.
Electric lamp making.
Electric light.
Engineers.
Gas works (various uses).
Glove makers.
Grocers.
Hairdressers.
Hay chopping.
Hay stores.
Hoisting goods.
Horse clothing.
Joinery works.
Knitting stockings.
Lamp cleaning.
Laundry work.
Leather works.
Malt works.
Meat cutting.
Mineral water works.
Newspaper offices.
Paint manufacturers.
Pork butchers.
Printing.
Rope spinning.
Sail makers.
Sausage makers.
Saw mills.
Seedsmen.
Sewage pumping.
Shirt makers.
Silk weavers.
Smiths' fans.
Tanners.
Tobacco merchants.
Ventilating rooms and workshops.
Water pumping.
Wood chopping.
Wool works.
Workshops of all kinds.
Workshops (private).
Yacht builders.

TECHNICAL RECORD.

THE COKE-HANDLING PLANT FOR THE NEW RETORT-HOUSE AT HALIFAX.

In last week's issue, we published the main portions of the paper read by Mr. Thomas Holgate, M.Inst.C.E., at the recent meeting of the Institution of Gas Engineers—illustrated by several types of coke-conveying plant already in operation or else partially completed. The author concluded his paper by giving an account of the coke-conveying plant proposed for the new retort-house at the Halifax Corporation Gas-Works; and we intend to-day to supplement what was given of Mr. Holgate's paper last week, by reproducing two more of the plans he exhibited when reading his paper, accompanied by the following descriptive details.

The new retort-house, which is intended for inclined retorts, is 266 feet long; and the settings will number 17 on the north side and 25 on the south side of the house. The quantity of coal to be charged per hour is estimated at 21 tons; and the quantity of coke to be removed (at a maximum) 60 tons per hour. The coke-conveying trough is to be from 24 to 30 inches wide and 9 inches deep, with manganese steel links 12 inches pitch, and scrapers placed at 24-inch centres, which are connected by a cranked arm to axles carrying on each side a flanged roller 6 inches in diameter by 1½ inches wide on the tread. The distinguishing feature of the arrangement is intended to be "the avoidance of wear inside the trough, and minimized wear upon the rollers and pins, by placing them out of contact with hot coke or water." The trough will probably be made of cast iron or steel, supported upon a framework placed below the retort-house floor. This will be necessary to avoid the shoots delivering hot coke from the retorts into the furnaces. The coke to be taken away by the conveyor, if the present suggestion is carried out, would be delivered by shoots in such a way as to cover up the chain and rollers, while leaving them accessible from the coke vault. The return chain is intended to be under the trough—the total depth being 44 inches; but this could, if required, be reduced to 36 inches.

The conveyor on the north side of the house will consist of a cast-iron trough, 1 ft. 6 in. wide at the bottom; the scrapers, of mild steel plate ¼ inch thick, being attached to cross-bars, carried at their ends by cast-iron rollers 6 inches in diameter, running on rails. The troughs will be supported by cast-iron brackets carried by a small gantry of 6-inch by 4½ inch joists. The return rail will be carried underneath by brackets from the gantry. The chain is to be of links with 12-inch centres and ⅞ inch pins—all of manganese steel. The cast-iron driving-drums are to be of hexagon pattern, securely keyed to a 4-inch diameter shaft, driven by gear-wheels 4 to 1. The training-drums, keyed to a 3½-inch shaft, will be carried in tension frames of suitable design for tightening the belts.

There is to be a cross-conveyor from the end of the one just referred to, to deliver on to the conveyor on the south side of the house. The trough is to be the same as the other conveyor; and the scrapers, rollers, and manganese steel links are of similar diameter. The drums, 14 feet centres, are to be carried by special brackets to suit an inclination of 45°.

The conveyor on the south side of the house is stated to be 248 feet long; and, in addition to carrying the coke from its own bed of retorts, it receives, at about its middle, the coke from the north-side conveyor through the cross-conveyor. The cast-iron trough in this case is 2 feet wide at the bottom; and the scrapers are of ¼-inch mild steel plate, carried by frames on rollers as in the other conveyor. The chain is to be of manganese steel links and pins. The driving shaft of this conveyor will be 5 inches in diameter.

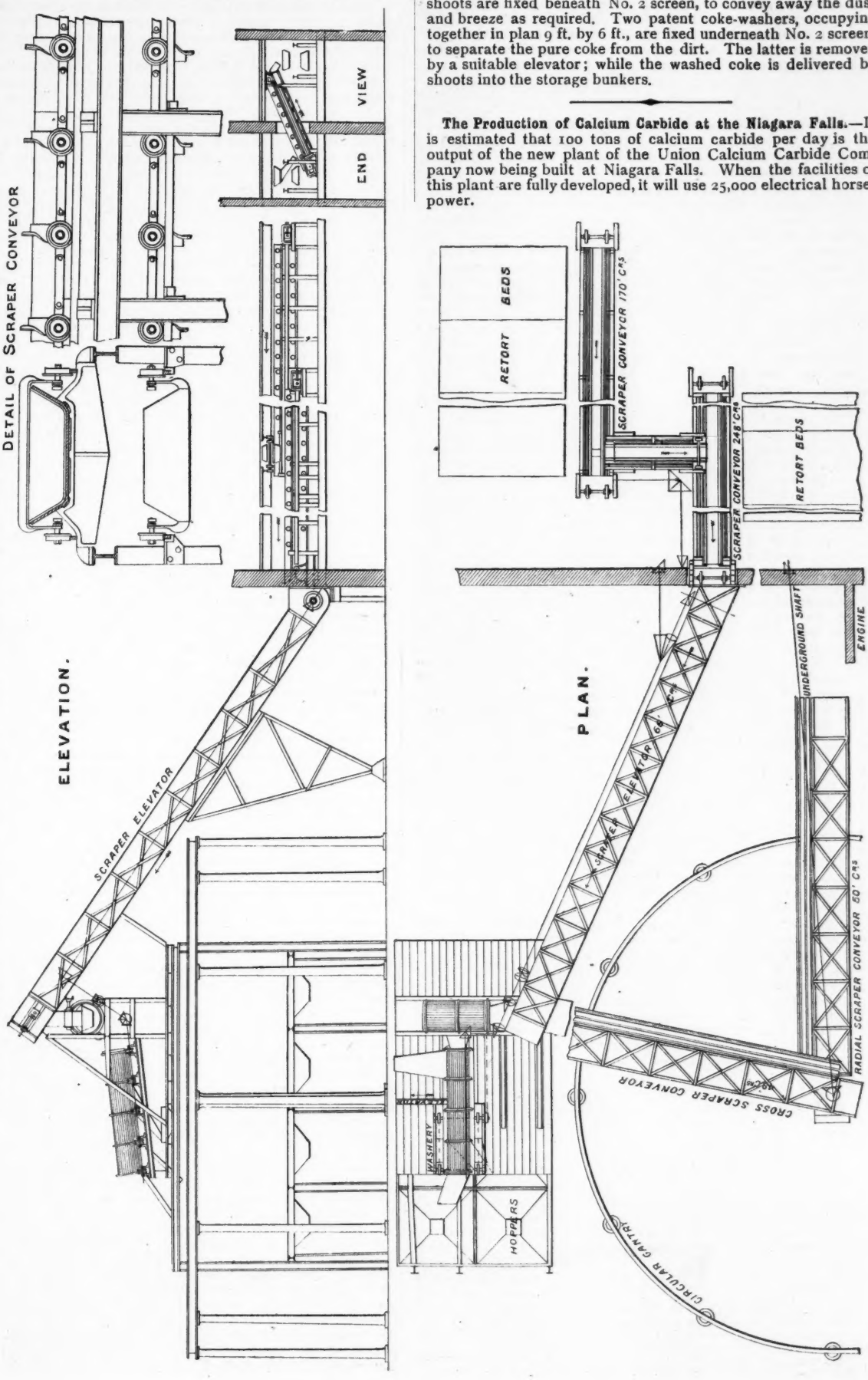
Shoots of suitable dimensions, and constructed of mild steel plates, are to be provided to conduct the coke from the first-named conveyor to the cross conveyor, and from the end of the south-side conveyor into the boot of the elevator. This latter piece of apparatus is to be of the scraper type; the troughs, scrapers, chains, and rollers to be in all respects similar to the north-side conveyor except that the troughs are to be 2 ft. 3 in. wide at the base and the centres of the drums 66 feet. The height above the yard-level at the end of the hot-coke conveyor is 9 ft. 6 in., and at the top of the elevator 45 feet. The elevator (fitted at an angle of 35°) is to be carried on a steel framework or girder, supported at the ends and in the centre by a steel braced column. It delivers into a shoot, the spout of which is pivoted so as to discharge into the screens or on to a further conveyor, as required. The shoot would be constructed of mild steel plates and angles, and be operated by a chain and lever.

The troughs for the last-named conveyor are to be 2 feet wide at the bottom; and the scrapers, driving gear, and links are practically similar to those for the south-side conveyor, except that the centres of the drums are in this case 48 feet. The conveyor is carried by a substantial steel lattice girder, 3 ft. 6 in. deep, at an elevation sufficient to allow the radial arm to describe a complete circle. The radial arm is carried by a substantial lattice girder 3 ft. 6 in. deep, one end of which is pivoted on to the top of a central column, while the other (outer) end is borne by a carriage running on a circular gantry, 26 feet above the yard level, and consisting of 12-inch by 5-inch joists carried on cast-iron columns.

The screen for large coke will be 4 feet in diameter and 8 feet long. It is carried on rollers grooved to suit the turned angle-iron rings of the screen—those on one side being keyed to a through shaft driving the screen by friction. The screen bars, ⅝-inch diameter, set to the required pitch, are secured to the rings by clips, which allow of the easy removal of any bars for repairs, &c. A second screen (for small coke) is to be 3 feet in diameter and 16 feet long, and to be in every way constructed similar to the larger one. The coke from No. 1 screen falls into a hopper (20 ft. by 20 ft. by 16 ft. = 6400 cubic feet) of mild steel plates and angles, and is delivered into No. 2 screen. Four hoppers (each 10 ft. by 10 ft. by 16 ft. = 1600 cubic feet) and shoots are fixed beneath No. 2 screen, to convey away the dust and breeze as required. Two patent coke-washers, occupying together in plan 9 ft. by 6 ft., are fixed underneath No. 2 screen, to separate the pure coke from the dirt. The latter is removed by a suitable elevator; while the washed coke is delivered by shoots into the storage bunkers.

The Production of Calcium Carbide at the Niagara Falls.—It is estimated that 100 tons of calcium carbide per day is the output of the new plant of the Union Calcium Carbide Company now being built at Niagara Falls. When the facilities of this plant are fully developed, it will use 25,000 electrical horse-power.

PROPOSED COKE-HANDLING PLANT FOR THE HALIFAX CORPORATION NEW GAS-WORKS.



THE WATER SUPPLY OF LONDON.

In the "JOURNAL" for the 25th ult., we published a full abstract of the first portion of a paper on the above subject read before the Society of Arts by Mr. WALTER HUNTER, M.Inst.C.E., Engineering Director of the Grand Junction Water Company, and Joint Engineer with Mr. R. E. Middleton, M.Inst.C.E., to the Staines Reservoirs Committee. It may be remembered that it consisted mainly of a description of the Water Companies works. We now deal with the second portion of the paper, in which the author discussed the quality of the present supply, and the proposals before the public in regard to the future.

The author introduced the subject now to be considered by assuming that his audience had gathered, from the particulars he had laid before them, that the purification of the water supplied to London is effected by sedimentation and sand filtration. The question of whether these processes were adequate to the production of a proper water supply was definitely referred to Lord Balfour of Burleigh's Commission in 1892-3; and their verdict was given in unmistakable terms. They said: "We are strongly of opinion that the water, as supplied to the consumer in London, is of a very high standard of excellence and purity, and that it is suitable in quality for all household purposes. We are well aware that a certain prejudice exists against the use of drinking water derived from the Thames and the Lea, because these rivers are liable to pollution, however perfect the subsequent purification, either by natural or artificial means, may be; but, having regard to the experience of London during the last thirty years, and to the evidence given to us on the subject, we do not believe that any danger exists of the spread of disease by the use of this water, provided that there is adequate storage, and that the water is efficiently filtered before delivery to the consumers." This was a very strong pronouncement in favour of the existing arrangements; and Mr. Hunter showed how strict a watch is kept over them by the two eminent Chemists who act on behalf of the Companies (Sir William Crookes and Professor Dewar) and the no less eminent one (Sir Edward Frankland) who tests the water chemically and bacterioscopically for the Local Government Board. In a report presented to that Department early last year, Sir Edward included a table which showed that whereas in 1868 there were only 48 occasions when the water supplied by the Thames Companies could be described as "clear and transparent," in 1897 the number was 84; and while there were nine cases of turbidity in the former year, in the latter there were absolutely none—the water not being even slightly turbid—while nine samples of deep-well water, which does not usually require filtration, were so. Remarking on this important fact, Sir Edward said it was evidence of the great improvement effected by the river-supplied Companies in their filtration plant since he began his examinations for turbidity in 1868. He further pointed out that the purest water contains suspended matter, but that the amount of it in the efficiently filtered river water supplied to the Metropolis rarely, if ever, exceeded 0·0002 grain in a tumblerful; and, therefore, in order to imbibe a single grain, it would, he said, be necessary for the consumer to drink no less than 5000 tumblerfuls of water. He thought such excessively minute quantities of matter, which was presumably harmless, might safely be neglected; indeed, it was practically impossible to obtain water free from it. Sir Edward went on to direct attention to the results of his bacterioscopic examination of the unfiltered waters of the Metropolitan Companies, which he said were very instructive. In March, 1897, while the Thames at the intakes of the Companies drawing their supplies from that river contained 50,560 microbes per cubic centimetre, the Chelsea Company, with ten days' storage, were supplying their filters with water containing only 580 microbes in the same volume. Again, in February, the East London Company, with twenty days' storage, kept the number down to 1050 per cubic centimetre, although 44,600 per cubic centimetre were passing the intake. In the same report, he gave the following particulars of the bacterial condition of the water issuing from the filter-beds of the various Metropolitan Water Companies during the year 1897, compared with the raw material dealt with by them: The average percentage of microbes removed by the Chelsea Company was 98·96; East London, 99·24; Grand Junction, 98·46; Lambeth, 99·50; New River, 99·09; Southwark and Vauxhall, 97·72; West Middlesex, 99·40. These results are borne out by Sir William Crookes and his colleague, who, in their report presented to the Official Water Examiner in October, 1897, said: "There is no city in the world where such minute and incessant care is taken daily, and almost hourly, to detect and report on the slightest deviation from the purity in its water supply. Apart from the daily bacteriological examination of the clear-water wells of the Company, we frequently make specific tests for the presence of pathogenic organisms. If any other than a negative result had been obtained, the fact would have been recorded." But the strongest practical proof, in Mr. Hunter's opinion, of the excellence of the London Water Supply is to be found in the record of the vital statistics of the Metropolis. He thought it would be conceded that no large city would have a death-rate of 18·2 per 1000 (the death-rate of London for 1897) unless it possessed a water supply of excellent quality.

Coming to the last branch of his subject—the supply of water in the future—Mr. Hunter gave a sketch of the appointment and work of Lord Balfour's Commission. In the course of an inquiry extending over 45 days, the Commission took into their purview a period of forty years, and, basing their estimate upon the decennial increase between 1881 and 1891, arrived at an aggregate of the population in 1931 of 11¼ millions in the area of which the water requirements were to be considered—viz., 845 square miles. Taking the needs of this population at 35 gallons per head per day, the average daily quantity required in 1931 was found to be 391,717,690 gallons. Adding 6 per cent. to provide for increased demand in hot weather and in times of frost, the Commissioners estimated the maximum daily provision required in 1931 at 415,219,752 gallons. To meet this demand, the Commission arrived at the conclusion that, if adequate storage were provided for the Thames and the Lea, the following quantity of water per day (in million gallons) would be available: From the Thames, 300; Lea, 30½; wells in the Lea Valley, 40; the Kent Company's district, 27½—total, 420, or sufficient, at 35 gallons per head per day, for a population of 12 millions. The Commission found, therefore, that sufficient water could be obtained from the present sources of supply to cover the requirements of London for the forty years which they took into consideration.

Mr. Hunter thought it might have been expected, after the valuable and exhaustive report of Lord Balfour's Commission, that the question of the London Water Supply might have been allowed to follow the recommendations of that Commission for many years to come. Such, however, was not the opinion of the County Council. In 1894, they instructed their Engineer (Sir A. R. Binnie) to report "on the site and yield of other sources of water supply, and as to the method which might be adopted for considering and supplying water to London with estimates of cost." His report describes a scheme for constructing large storage reservoirs for impounding the waters of the Rivers Usk and Wye, and several tributaries, and bringing the water so collected to London by two aqueducts about 160 miles in length. The quantity of water to be provided from a catchment area of 488 square miles, with a rainfall varying from 45 to 70 inches per annum, was 415 million gallons a day, to be delivered into reservoirs at Elstree and Banstead, at a total cost of £38,772,280. Sir Alexander proposed to construct the works in two instalments—the first to bring 182 million gallons daily to Elstree, at a cost of £17,500,000, to be supplemented by the Edw, with 18 million gallons additional, or a total of 200 million gallons daily, at a cost of £18,095,250. The second instalment (to be made at a later date) would complete the supply of 415 million gallons, at the total cost before stated. If to this quantity were added 67 million gallons of water daily available from chalk wells near London, a total supply of 482 million gallons would be obtained—sufficient for the wants of a population of 13,800,000, or down to the year 1943.

Fortified with this report, the County Council have opposed all legislation based upon the recommendations of Lord Balfour's Commission; and, notwithstanding the fact that the question of the Metropolitan Water Supply was being considered by Lord Llandaff's Commission, they have endeavoured to forestall any recommendations which may be made by promoting Bills in the present session for the purchase of the Companies' undertakings, and for carrying out the first portion of their Welsh scheme, as proposed by their Engineer, but slightly modified in accordance with suggestions made by Sir Benjamin Baker and Mr. Deacon. Discussing the position of the parties, Mr. Hunter said: Now, in considering the policies of the County Council and of the Companies, it must be remembered, first, that, as previously shown, the water, as supplied to London, is "of a very high standard of excellence and purity, and suitable in quality for all household purposes." Further, the late Mr. Hawksley showed, from the health statistics of many towns in England, that those which are supplied by river water are generally more healthy than those supplied from a mountain source. It must also be remembered, secondly, that the total supply to be obtained under the Welsh scheme is 415 million gallons daily, which, upon the usual proportion, would give about 553 million gallons daily as the total yield of the reservoirs. On the other hand, the Thames possesses an average flow of 1300 million gallons daily upon a cycle of years. It seems absurd, therefore, to leave a larger and equally good supply, obtainable close to London, for another supply from a distant source, unless and until the expense of developing the larger becomes greater than that which would be incurred in utilizing the smaller and distant supply. For see what would happen. After exhausting the capacity of the Welsh supply, it would be necessary to go back again to the present sources, which the promoters of the distant scheme now affect to despise. The question, therefore, resolves itself into the comparative cost of the two schemes. It would be impossible for me in the time at my disposal to present to you all the figures and estimates which my friends Sir Alexander Binnie on the one side and Mr. R. E. Middleton on the other have, with marked ability and untiring industry, laid before Lord Llandaff's Commission. I purpose, therefore, to lay before you the figures at which, after mature consideration, I have myself arrived, which have the advantage of lying between those for which the two Engineers referred to are responsible. My results, however, are much nearer Mr. Middleton's than Sir Alexander Binnie's, as they are based upon the same estimates of the Welsh scheme by analogy with the cost of the Thirlmere works for Manchester, the

Vyrnwy works for Liverpool, and the Elan works now being constructed for Birmingham. Until the surveys, drawings, and bills of quantities are prepared, the land scheduled, and detailed prices worked out, I am of opinion with Mr. Middleton that the estimate by analogy with the cost of works carried out by some of the ablest engineers of the day is by far the more reliable method of arriving at the cost of the Welsh works. In regard to the Thames scheme the case is different. We know the exact price of the present works as let to the Contractors, and the prices paid for the land. The working out of an estimate is perfectly simple, and must be accurate therefore. In making the comparison between the cost of the two schemes, I have endeavoured to hold the balance equally and fairly between them. The result is shown in the following table:—

Summary of Cost of Welsh and Thames Schemes at 1916, 1920, and 1936, the dates at which further supplies will be required.

WELSH SCHEME.

Estimates made by analogy from cost of Thirlmere, Vyrnwy, and Elan Valley works. (1) First quantity, 121 million gallons daily supply, 1916 or 1920; (2) second quantity, 93 million gallons daily supply, 1936.

	Cost of Works.	Interest during Construction.	Capitalized Pumping Charges.	Total.
(1)	£20,600,551	£3 190,150	£87,747	£23,878,448
(2)	12,112,314	1,092,888	85,515	13,290,717
	£32,712,865	£4,283,038	£173,262	£37,169,165

THAMES SCHEME.

Estimates made under conditions of 1898; minimum flow, 100 million gallons at Teddington. (1) First quantity, 121·5 million gallons daily supply, 1920; (2) second quantity, 93 million gallons daily supply, 1936.

	Cost of Works.	Interest during Construction.	Capitalized Pumping Charges.	Total.
(1)	£4,483,000	£ 59,717	£2,992,537	£8,035,254
(2)	4,309,670	£543.190	2,610,597	7,463 857
	£8,792,670	£1,102,507	£5,6 3,524	£15,499,111

Estimates made under conditions of 1898; minimum flow, 200 million gallons at Teddington. (1) First quantity, 121·5 million gallons daily supply, 1916; (2) second quantity, 93 million gallons daily supply, 1936.

	Cost of Works	Interest during Construction.	Capitalized Pumping Charges.	Total.
(1)	£6,773,930	£1,104,719	£2,741,026	£10,919,675
(2)	5 039,920	632,933	2,680,278	8 353,131
	£11,813,850	£2,037,652	£5,421,304	£19,272,806

Estimates made under conditions of 1893, minimum flow, 200 million gallons at Teddington. (1) First quantity, 121·5 million gallons daily supply, 1916; (2) second quantity, 93 million gallons daily supply, 1936.

	Cost of Works.	Interest during Construction.	Capitalized Pumping Charges.	Total.
(1)	£5,340,710	£943,673	£2,732,808	£9,017,251
(2)	5,248,790	674,235	2,687,204	8,610,229
	£10,589,500	£1,617,908	£5,420,072	£17,627,480

It is fair to say that the Thames estimate under the conditions of 1898 would be slightly increased, as the estimates were made in November, and would in no way alter the estimate under the conditions of 1893. It will be seen from the table that the cost of the Welsh scheme for the supply of the same quantities of 121·5 and 93 million gallons daily, will be, in round figures, from 2 to 2½ times the cost of the supply of the same quantity by the Thames scheme, dependent upon the minimum flow fixed at Teddington. The above quantities, added to the 185½ million gallons already authorized, provide for a total quantity of 400 million gallons daily being taken from the Thames—sufficient, with the water available from the Lea and wells in the chalk, for the supply of the Metropolis until the year 1948, supposing the population should in the meantime increase in accordance with the figures accepted by the Balfour Commission. There will therefore be no necessity even to consider any question of increased draught from the Thames, or the provision of water from an outside source, for at any rate the next forty years. It is possible, and indeed probable, as has already happened, that the population will not increase in anything like the same ratio as in the decade from 1881 to 1891. The adaptability of the Thames scheme to meet such a contingency is one of its most valuable features; as the storage reservoirs contemplated under it need only be constructed as the actual growth of the population renders them necessary. Should the population increase at a slower rate than is estimated, the work could be retarded until they are actually required. On the other hand, the larger part of the expenditure upon a supply from distant sources must be incurred at the outset, and may eventually be found to have been undertaken upon too large a scale; laying unnecessary financial burdens upon the ratepayers and water consumers. I would remind you that there is no record, in ancient or modern times, of a city containing 12 million inhabitants.

It is impossible, within the scope of a paper like the present, to enter into all the arguments for and against the purchase of the Companies' undertakings by the County Council; and it is no doubt undesirable to discuss this question at the present moment, when the whole subject is under consideration by a Royal Commission. It is, however, necessary to remember that any purchase, to be fair, must take into consideration prospective as well as present profits and liabilities, and therefore cannot be a source of profit to the purchaser; and, further, that the County Council are pledged to the Welsh scheme, which, as has been shown, must result in heavy additional expense as compared with the development of the present source of supply. In addition, the Council will have to provide a sinking fund to pay off the capital sum within a certain fixed period, which will entail heavy additional cost upon the water consumers of the present and next two generations for the benefit of posterity.

The foundation of the greatness of Britain is private enterprise. The reward which successful enterprise brings is the great incentive to the ablest men of each generation to apply their powers to advance the general knowledge and add to the comfort, convenience, and happiness of mankind. Municipalization tends to discourage private enterprise, and to foster the socialistic ideas now popular with a certain school of politicians, the triumph of which will, in my opinion, be the commencement of the decadence of England. On these grounds, I am opposed to the municipalization of the Water Companies' undertakings, unless a clear gain to the community is to be the result. I believe I have shown that the policy of the London County Council will result in a heavy loss to the consumers and ratepayers. Therefore I am of opinion that the adoption of that policy would be detrimental to the public interest. On the other hand, the Companies have shown, by the excellent manner in which they have fulfilled their obligations, by their joint action this year in combining to secure the supply of every district of the Metropolis, and by the declaration of their readiness to be, under all circumstances, responsible for the provision of an ample and satisfactory supply of water, that they are worthy of the position they hold, and deserve the continued confidence of the community.

At the close of the paper, the Chairman (Mr. W. Whitaker, F.R.S.) made a few remarks by way of opening the discussion. He said the word "water" implied a cooling drink; but, curiously enough, when the word "supply" was added to it, people generally grew warm, and if the two words were preceded by London, the temperature rose almost to boiling-point. The question of the London Water Supply usually gave rise to hot discussion. But, after all, it was a good thing for great questions like this to be well fought out; for there was no way of arriving at the truth so certain as by thorough discussion, especially in scientific and engineering matters. However different their views might be as to the means, the object of all, whether the advocates of municipal management or of private enterprise, was to get a good supply of water for London. It was sometimes said that the London County Council or some other body wished to confiscate private property. Whether they wished to do so or not, he was quite sure they would not succeed, for Parliament would never hand over to a corporation a company who were doing their work properly, without making the corporation pay uncommonly well for the bargain. If a trading company were not doing their duty to the public, of course it was another matter altogether. It was said that a company was only a trading body, whose prime interest was the profit of the shareholders. Assuming this to be so, no company could succeed who supplied a bad article. Even the warmest advocates of municipal control would allow that in this country companies had done their work uncommonly well; and certainly in one thing the London Water Companies had done well. They had taken good care to have the best engineers they could get; and they had been very well served by those engineers. The London Water Supply was peculiar in this respect, that he did not think there was any other part of the kingdom in which it would be possible to get a supply for a large city like London right in the middle of the river valley. No one would attempt to get such a supply from the Severn, or any of the other large rivers. The Thames happened to be a good river where one could get intakes at all events not very much, if at all, polluted. Of course, there was always a risk of pollution to some extent; and the London Water Companies would have that risk. But they were not simply water-getting Companies—they were manufacturers; they had to treat the water to deprive it of any harmful properties it might have, and to send it out in a fit state for consumption. From this point of view, the effects they produced were very wonderful—effects which were never dreamt of when sand filter-beds were first thought of. It was now known that the surface layers of sand on which a slight organic film formed actually purified the water bacteriologically, and destroyed its most injurious contents. Those who opposed the Companies would probably allow that they had done their best to improve the supply. Of course, they had made mistakes; but when these were pointed out they did their best to set them right. It seemed a curious thing to him that there should be eight different Companies supplying London; and he should like to see them joined up. Another peculiarity of the London Water Supply was the variety of the sources from which it was derived. He did not refer to the Thames and the Lea, which were, for practical purposes, two parts of the same river. A much larger quantity than most people were aware of was obtained from wells—quite enough to supply any other town in the kingdom.

Mr. J. W. Restler, the Engineer of the Southwark and Vauxhall Water Company, said there was one point which he thought might have been even more emphasized. It had been held out to the ratepayers that there would be a great saving to them if the Water Companies' undertakings were to be transferred to the

London County Council; but, as had been pointed out, any purchase would have to be made on the basis of the present and prospective value, so that future profits would be discounted. On the other hand, if the Companies were left alone, part of the future profits must come back to the ratepayers after 10 per cent. was earned, which was now practically obtained by all of them. Any extraordinary expenditure, however, for new sources of supply or additional reservoirs would have to be paid for out of the pockets of the shareholders.

In the course of some further remarks, the Chairman said he visited the Chadwell spring, in company with Mr. Francis, the Engineer to the New River Company, last autumn, when it was at its driest; and he was surprised to find it so dry, even with the extreme drought then prevalent. It was a hole 20 feet deep, and though it was not really dry, it had fallen below the level at which it overflowed. No living person had ever seen it so low. The Company did not know what the bottom of it was like; and he was rather glad they had the opportunity to clean it out. Although a chalk spring, it was very cloudy—there being hills all round of drift gravel, sand, and loam; and no doubt some of the finer particles were brought in very quickly after rain, as was the case with other springs in that part of Hertfordshire. It generally yielded from 3 to 4 million gallons a day to the New River. He was sorry the Water Companies did not propose their junction scheme earlier; but no doubt it was a step in the right direction. It would prevent such a thing as happened last year, when the Company who wanted the largest supply ran short. In future, those who had more than they wanted would be able to supply those who had less. This was the principle adopted in rating—the richer parts helped the poorer; and, on the whole, it was right that it should be so.

In replying upon the discussion, Mr. Hunter said there was no doubt the shortness of the East London supply last year—which, after all, was a very good supply—was due to the unprecedented drought. The rainfall was 2½ inches less than in any year of the 82 during which records had been kept at Greenwich. It deceived not only ordinary engineers, but the Engineer of the London County Council, for he said, in 1897 or 1898, that he considered the East London Company had plenty of storage. They could only judge of the present and future by past experience; and it would be very uneconomical to allow a greater margin than appeared sufficient. The Companies themselves proposed to link up their various works in the way which commended itself to the Royal Commission; and they were now spending upwards of £100,000 upon it, from which the shareholders could not get a penny of dividend, simply with the view of inspiring confidence in the consumers, and to show that the Companies did really intend to safeguard the water supply of all parts of the Metropolis. No men were more anxious to fulfil the obligations laid upon them than the Directors and officials of the Companies, because they knew that in so doing they were serving the best interests of the Companies themselves. With about 870,000 consumers, the serious complaints received might be reckoned on the ten fingers. This he thought spoke volumes for the efficiency of the administration. The statistics, and the evidence of entirely independent witnesses, showed how they had succeeded in giving an admirable supply of water as regards quality. The quantity had been ample hitherto; and now that the whole of the districts were to be linked together, it would be ample in the future.

A vote of thanks to Mr. Hunter was unanimously accorded.

Maldon Water-Works Transfer.—It was reported at a special meeting of the Maldon Town Council last Tuesday, that the arrangements for taking over the water-works had been completed, and the undertaking was now the property of the Corporation. Under the agreements, the servants of the Company became the employees of the Corporation, unless either wished the contrary. A letter was read from Mr. Rogers, a member of the Council and Secretary to the Company, stating that, as he had elected not to continue in the service of the Corporation, he should be obliged if the Council would pass an order for the payment to him of £250, as agreed upon, as compensation for his relinquishing his secretarial office. Mr. Rogers's resignation as Secretary was accepted; and it was agreed to pay him the compensation named.

The Remuneration of the Plymouth Water Engineer.—The question of the remuneration of Mr. E. Sandeman, the Water Engineer of Plymouth, for his extra labours in connection with the construction of the new storage reservoir at Burrator, was again discussed by the Town Council at a recent meeting. Last month (*ante*, p. 995), the Council, by 40 votes to 11, rejected a proposal of the Water Committee to pay Mr. Sandeman 700 guineas for this work. Mr. W. Y. Woollcombe now proposed the appointment of a Special Committee to inquire and report "for the purpose of enabling the Council to judge whether the Water Engineer has been remunerated properly, or at all, for his services in connection with the Burrator works, and whether he had reason to suppose that his salary was intended to recompense him for those services." Mr. S. J. Page opposed the appointment of the Committee because it involved recognition of the principle that Committees and Sub-Committees might pledge the resources of the Council. The bonus principle was also wrong; and they had no right to advertise for an official at a salary of £250, and increase his remuneration by bonuses to £500. Alderman J. T. Bond, Chairman of the Water Committee, said the works at Burrator did not come within the terms of the Water Engineer's appointment; and Mr. Sandeman had been badly served. By appointing a Committee to ascertain the facts, they would be taking a wise and proper step, which might lead to a solution of the present difficulty. The motion was carried by 27 votes to 14.

CORRESPONDENCE.

[*We are not responsible for the opinions expressed by correspondents.*]

Mechanical Coke-Handling Plant for Inclined Retorts.

SIR,—In the last issue of the "JOURNAL," in the discussion on Mr. Holgate's paper at the recent meeting of the Institution of Gas Engineers on page 1358, Mr. Stevenson, of Manchester, is reported to have said that, "so far he was aware, when he decided upon it there had not been any mechanical conveyor for coke applied to inclined retorts." I beg to say that we have had in successful operation here for a period of six years both coke conveyors and elevators which deal with the whole of the coke produced from our inclined retorts.

THOMAS BOWER.

West Hartlepool, May 26, 1899.

The Welsbach System for Public Lighting.

SIR,—I have recently fixed over 1000 Welsbach burners in the street-lamps of this town; and they have given such satisfaction that considerable extensions have been authorized by the Council. The anti-vibration system adopted is that known as the Bradford patent. This, after many experiments, I have found to be the best one extant.

In the first instance, unfortunately, the Welsbach system involved the lamplighters reverting to the ancient practice of carrying a ladder upon their lighting rounds, although, of course, the ladder was unnecessary when extinguishing. To obviate the necessity of a ladder being used for lighting, I have tried the burners with 6-inch chimneys, instead of 8-inch ones, and find that with this shorter length, the burners are readily lit with the torch in the ordinary way—rendering the ladder superfluous.

As it is not unlikely many towns are contemplating either adopting or extending the Welsbach system for public lighting, they may like to know our experience as regards lighting. Specially designed street-lanterns (such as are adopted in Liverpool and elsewhere) involve a considerable amount of expense in the first instance, whereas with a 6-inch chimney upon the burner, no further difficulty is experienced in lighting.

The vastly improved appearance of the main streets of the town is freely commented upon, which, of course, is a source of gratification. The lamplighters soon get used to the Welsbach burners, and are able to put new mantles on, and adjust the burners, expeditiously and carefully.

EDWARD A. HARMAN.

Huddersfield, May 27, 1899.

PARLIAMENTARY INTELLIGENCE.

THE CONTEST FOR THE DERWENT WATERSHED.

The principal event of the present session, as far as provincial water supply is concerned—the contest between the Corporations of Derby, Leicester, and Sheffield for the watershed of the River Derwent—has lately been the subject of inquiry before a Committee of the House of Commons presided over by Sir John Brunner; the other members being Sir George Fardell, Colonel Welby, and Mr. W. Jones.

The schemes submitted to Parliament by the above-named bodies have been noticed in the "JOURNAL" (*ante*, pp. 433, 434, 970); but they may be again briefly described. The Corporation of Derby seek authority to obtain a supply of water from the Rivers Derwent, Ashop, and Noe, and the Burbage Brook; to supply water by agreement to neighbouring Local Authorities; and to construct additional water-works and aqueducts, lay mains, &c., involving an expenditure of £6,150,000. With similar objects in view, the Corporation of Leicester desire authority to raise, by way of loan, capital amounting to £4,144,000, and any further sums that may be required for the payment of interest upon capital during the construction of the works. The Corporation of Sheffield ask to be empowered to construct works for impounding the waters of the Derwent and Ashop and their tributaries; to sell water in bulk to other Corporations (particularly Rotherham and Doncaster) and Local Authorities on the line of the aqueduct; to provide for the constitution of a Joint Water Board; and to borrow money to the amount of £2,275,000 for water-works and other purposes. These were the schemes referred to the Committee, who commenced the consideration of them on the 26th of April, and continued their inquiry almost uninterruptedly till the adjournment for the Whitsuntide holidays. When this stage was reached, an announcement was made that during the recess an agreement might possibly be arrived at between the contending parties. If this should be done, the labours of the Committee will be considerably shortened. Meantime, we give a condensed report of the proceedings so far as they have gone.

It is scarcely necessary to say that all the schemes were pretty strongly opposed; and consequently the services of practically the whole of the Parliamentary Bar were secured on one side or the other. Mr. Worsley Taylor, Q.C., the Hon. J. D. Fitzgerald, Q.C., Mr. Ram, and Mr. Vesey Knox appeared for the Corporation of Derby; and the numerous petitioners against the Bill were represented as follows: The Corporation of Sheffield, by Mr. Littler, Q.C., Mr. Claude Baggallay, Q.C., Mr. Gerald Fitzgerald, Mr. Lewis Coward, Mr. Moon, and Mr. Shaw; the Corporation of Leicester, by Mr. Pope, Q.C., Mr. Balfour Browne, Q.C., Mr. Freeman, Q.C., and Mr. Honoratus Lloyd; the Corporation of Nottingham, by Mr. Pember, Q.C., Mr. Stanger, Q.C., and Mr. Pritchard; the Nottinghamshire County Council, by Mr. Hans Hamilton; the Derbyshire County Council by Mr. Macmorran, Q.C., Mr. Rickards, and Mr. Hextall; the Duke of Norfolk, by Mr. Pember, Q.C., Mr. Erskine Pollock, Q.C., and Lord Robert Cecil; the Chesterfield Urban District Council and the Chesterfield Gas and Water Board, by Mr. Rickards; the Corporation of Rotherham, by Mr. Wedderburn, Q.C.; the Rural District Council of Basford, by Mr. Frere; the Duke of Devonshire, by Mr. Pember, Q.C., and Mr. Marshall, Q.C.; and the Wortley Rural District Council, by Mr. Shiress Will, Q.C. The Bill of the Leicester Corporation was opposed by most of the foregoing, with the addition of the

Derbyshire County Council; the Leicestershire County Council, represented by Mr. Acworth; and the Corporations of Derby and Sheffield, whose Counsel are given above. Against the Sheffield Bill there was much the same opposition. Besides the Corporations of Derby, Leicester, and Newark-on-Trent, the Corporation of Rotherham presented a friendly petition against alterations.

At the opening of the proceedings, the Chairman pointed out that the effect of the three Bills being taken as it were simultaneously would necessarily be to involve the attendance of the Corporation officials and the Counsel engaged on each of the Bills the whole of the time. On behalf of the Committee, he appealed to the officials not to overload their case, on the ground that the Committee were desirous of saving the public expenditure. Mr. Worsley Taylor said he was very glad the Chairman had mentioned the matter. As far as the promoters were concerned, they had cut down their evidence to the very smallest possible limits. The Chairman added that all repetition would be entirely unnecessary.

Mr. Worsley Taylor then proceeded to open the case for Derby. He said the object of the Bill was, in the first instance, to provide a larger and better supply of water for Derby itself, and for the people living within the water limits of the Corporation; and while going to a new catchment area for their own purposes, that new area being upon the head waters of the Derwent and one of its tributaries—the Ashop—they proposed to utilize the catchment area in the best and most economical way, having regard not merely to the wants of Derby and its water district, but to those of other communities which the Committee might determine had claims upon the watershed. The catchment area comprised in the Bill was something like 32,000 acres in extent; the total gross yield of which was about 50 million gallons per day. The Committee would have to deal with three rival Bills, each seeking to go to the same area; and against each there were a considerable number of petitions. The total interests concerned were therefore very large. The capital involved in the Derby Bill was £6,150,000; and the estimate for the whole of the works was £4,600,000. The scheme was of necessity large, because the Bill was an attempt to deal completely with a very large question—one which was as great, as complex, and as difficult as any which had been put before Parliament out of the London area. Counsel proceeded to give the water history of the borough, and to state how the Company which used to supply it was bought out, mainly on the initiative of Sir Henry Bemrose, in 1879. The water undertaking had been a great success, the profits now amounting to about £10,000 or £11,000, and there being a reserve fund of £26,000. In 1895, it was brought to the notice of the promoters that the water question involved to some extent also the supply of populations around them in the county. The daily supply on which Derby could rely at present was 3¼ million gallons; and the maximum demand had already risen to 3½ million gallons. Possibly they had some small stores yet undeveloped, but substantially no one would deny that Derby had come absolutely to the end of its resources, and that another supply must be secured at the earliest possible moment. Even if they had not been in immediate want of water, they would have been moved to go to the present area by the knowledge that Leicester and Sheffield were both casting longing eyes upon it. As they wanted water, there could be no question as to where they ought to go. This question was solved by Nature and according to settled parliamentary practice. The rule laid down by Parliament was that a place should go for further supplies to its own gathering-ground; and they also had a right, he thought, to a reasonable choice of sites for their reservoirs. Derby ought also to look ahead for a reasonable number of years. As this was their last chance, it would be wrong if they limited the scope of their Bill to 25 or 30 years, as might otherwise have satisfied them; and it was right, therefore, that they should make provision for something like 50 years, as they did. Sheffield had sufficient water for the next 30 years; yet they were coming for a further supply. In 1951, Derby would have some 283,000 people within their water limits, who would want, on a moderate estimate, from 9 to 10 million gallons a day. That Derby was right in going to this watershed was proved by the action of the two rival Corporations—Sheffield and Leicester—who had each proposed to Derby that they should unite in a scheme for utilizing the watershed by a Joint Board. Both Corporations recognized that Derby would have the paramount right in the watershed. But, with all respect for Sheffield, Derby declined to be bound up with them in any way. They also objected to having a Joint Board with Leicester, and desired to deal merely with their own interests in the county of Derby. The burgesses were quite willing to take upon themselves any risk which Parliament might empower them to run. The Bill was an honest attempt to solve a great and difficult question, both engineeringly and financially; and he ventured to say that when the Committee had heard the evidence they would decide that it was a prudent measure.

This brought the first day's proceedings to a close.

On the resumption of the inquiry the next morning, Mr. Worsley Taylor stated that the Derbyshire County Council had been settled with; and he then proceeded to deal with the various petitions. With regard to that presented by the Sheffield Corporation, Counsel said that had it not been for the fact that the Corporation had promoted a competing Bill, they would not have had *locus standi* against that of his clients. Having regard to the allegations in the petition, and to all the circumstances of the case, he felt justified in characterizing the Sheffield Bill as a sham, and as one of the most barefaced attempts at water grabbing ever made before Parliament. Dealing with the Leicester scheme, he said Derby claimed an absolute priority over Leicester in the right to supply water to the people of the surrounding district whom the Committee might determine had the right to a share in the water of the Derwent Valley. Derby also claimed that their scheme was in several respects much better than that of Leicester.

The first witness called in support of the Bill was Sir Henry Bemrose, M.P. He produced a table showing the growth of the water undertaking from 1879, when the Corporation acquired it, down to the present time. A deficit was turned into a profit in the third year after the Corporation took possession. The capital expenditure on the water-works was £351,000. The need for an increase was apparent, and Derby wanted a softer supply than they had at present. They had power to take water from the Derwent whenever they required it. In 1897 they had recourse to the river on 17 days, and in 1898 on 130 days. In August last, his Corporation notified the Leicester and Sheffield Corporations that they intended to go to Parliament for powers to increase their supply from the Derwent. In rejecting the Sheffield proposal for a Joint Board to administer the waters of the river, Derby had in view not merely the interests of the borough, but those of the county generally. The Bill of the Corporation had been framed as a complete scheme for dealing with the whole of the waters in the Derwent Valley watershed. The estimated cost of the two reservoirs, where the head of water was greatest and the water purest, was £1,500,000 for the supply of Derby and the county. Against this there would be an annual estimated profit of £23,500, and a saving of expenditure on the works amounting to £4823; but there would be a deficiency of £13,457 per annum, which would be met during the next twelve years by accumulations from the reserve fund of £160,131. The Corporation considered that the consumers in the watershed of the Derwent had first claims upon the water; and that after their present and future requirements were met, the consumers in the watershed of the Trent came next. If there was any surplus, Derby was quite willing to supply Leicester or any authorities who were considered by the Committee to be entitled to be served.

Cross-examination of the witness elicited the admission that, if the Derby scheme were sanctioned, it would be impossible for any other authority, by an independent scheme, to draw upon the head waters of the Derwent. He did not believe Nottingham would be placed at a disadvantage by having to take water from Derby, instead of from the river. After Derby and the county had been supplied, he considered that, apart altogether from its needs compared with those of Leicester or Derby, Nottingham had the next claim in order of priority. If they obtained two of the proposed reservoirs (the Howden and the Ronksley), the town would get an additional 10 million gallons of water a day, or sufficient for the town until 1951, but not for the county. On a review of the whole position, Derby did not consider it wise to determine what authority had a right to the waters in question; and therefore they did not entertain the idea of having a Joint Board with Leicester. No doubt the Derwent was capable of supplying Leicester, Derby, and any other places. But there was never any idea that the Corporation of Derby should become a trading company for the purpose of profit; and they did not desire possession of the watershed for the purpose of keeping other people out.

When the proceedings were resumed the following day, Sir Henry Bemrose was in attendance for the purpose of being further cross-examined by Mr. Littler, on behalf of the Corporation of Sheffield; but before the actual resumption of business the members of the Committee engaged in an animated consultation with the Chairman, who subsequently said they had decided to clear the room, for the purpose of deliberating in private, and they would be glad of the assistance of Counsel representing the Corporations of Derby, Sheffield, and Leicester. After the Committee had deliberated for an hour and a half, the public were re-admitted, and the Chairman expressed regret that the inquiry had been interrupted for so long, especially as he had only, as the result, to ask Counsel for Derby to proceed with their case.

Sir Henry Bemrose was then cross-examined by Mr. Littler. Counsel put it to witness whether, in view of the fact that Sheffield, under the compulsion of Parliament, had been deprived of a portion of its natural watershed by Dewsbury and Barnsley, and was more nearly approaching to extreme scarcity of water than was generally supposed, the Corporation should not have the right to ask Parliament to be recouped by getting a portion of the water from the valley of the Derwent. Witness replied that this was a question for Parliament to decide. He thought Sheffield had no claim, for the reason that it was not in the watershed proposed to be taken. Counsel then put this question to the witness: "Suppose we prove that there is water enough there for many years to come for Derby, Leicester, and Sheffield, is it right that any one of these three authorities should take the whole of the watershed?" Witness replied that it was not right that any one of them should take it and keep it for their own use. Counsel submitted that Derby was trying to take it away from Sheffield, which was the nearest town to the watershed; and he asked witness if it was right to take the whole of the watershed from Sheffield, with its population of 400,000, and sell the water to persons who had not asked for it. Witness simply repeated his previous answer that this was a question for the Committee. He could not give an opinion upon it. Mr. Littler, however, held on to the point, and asked: "Is it not infinitely more reasonable that Sheffield, Derby, and Leicester, the three great populations who must want the water, and can all be accommodated there, should be so accommodated?" Witness replied: "I must adhere to the plan we have before the Committee."

In re-examination, witness said he was personally strongly against the formation of a Joint Board. The fact that Sheffield, on their own contention, did not require water for many years, was a very good reason why it was undesirable that their claims to this water, if they existed, should be considered by the promoters now. Further, if Sheffield were to get this water from the Derwent, they would take it to supply those whom they were not bound to serve. Asked if it would be a very serious matter for the head waters of the Derwent to be taken by Sheffield to supply towns in a wholly different watershed, out of which they would make a profit, witness said the promoters had a strong objection to it. If Sheffield's demands were granted, the effect would be to oust those having prior rights—viz., Derby and Leicester, and Nottingham also if it needed it. Witness was then examined with regard to the meetings held under the Borough Funds Act; it having been alleged that the provisions of this Act had not been complied with. Witness said, although the amount of capital sought to be expended might not have been specifically mentioned at the meetings, the figure of £6,500,000 had been given in the local papers; and no one had raised any objection to it. The inhabitants were unanimously of opinion that the Bill should be proceeded with. The Chairman here interposed, and said he thought this point need not be pressed.

The next evidence bore upon the quality of the water to be taken under the Bill. Mr. Otto Hehner, the Public Analyst for Derby, testified to the purity of the water in the Derwent Valley, and as to the necessity for a fresh supply for Derby and the districts sought to be included in their scheme. In reply to the Chairman, he admitted that it would be necessary, under certain conditions, to take precautions to get rid of the acidity which the Derwent water took up from the moorland, in order to counteract its effect on lead pipes. Mr. Hehner was followed by Dr. Sidney Barwise, Medical Officer of Health for Derbyshire, who said that

since his appointment in 1891 he had devoted the whole of his time to analyzing the quality of the water in the county. The rate of typhoid fever was higher there than in other counties. Witness went on to say that by the Bill there would be a reserve of from 12 to 17 million gallons of water. In cross-examination by Mr. Claude Baggallay, witness freely admitted that it was proposed to lock up a large portion of the 17 million gallons for some forty years, in order to provide for people, if they were there, at that distance of time. He was further cross-examined by the above-named Counsel with the view of showing that, although it might be desirable to have a fresh source of water supply for the town and county of Derby, the increase of population was not such as to make it at all likely that they would require the whole of the water from the Derwent watershed within any reasonable period of time.

At this stage, Mr. Macmorran informed the Committee that an arrangement had been come to between the Derbyshire County Council and the Corporation of Derby as to the clauses which were considered sufficient for the protection of the Council, whose witnesses might be regarded as appearing on behalf of the Corporation. Mr. Hughes Hallett then gave evidence in support of the Bill. He stated that, at the special request of the District Councils of Belper and other places, clauses had been drafted providing for the constitution of District Water Committees. The Corporation of Derby had met the County Council in the fairest possible spirit, with results which would be very advantageous to the county. In these circumstances, the Council gave their cordial and hearty support to the scheme of the Corporation, and strenuously opposed the proposals of the Corporations of Sheffield and Leicester. In cross-examination, witness said the Council had had before them a proposal forwarded by the Corporation of Sheffield, with the object of bringing about an amalgamation between Sheffield, Derby, Leicester, and Nottingham; and the Council raised the most strenuous objections to it. They regarded the Sheffield scheme as an absolute failure. They had never considered the question of a Joint Board, but they had thought as to whether an amalgamated scheme could not be carried out. The Council's contention was that both Derby and Nottingham had prior claims to the Derwent Valley waters as compared with Leicester, and that Sheffield had no claim whatever—that, in fact, the claim they put forward was preposterous. If Sheffield came in, he did not think there would be sufficient water to supply the districts lower down. Assuming a Joint Board was formed, Nottingham ought to be represented upon it. Mr. G. Strutt, an Alderman of the Derby County Council, and Chairman of the Public Health Committee, gave evidence to the same effect. He stated that in his opinion the provisions which the Corporation had agreed to insert in the Bill, at the request of the County Council, were such as ought to satisfy any reasonable man. The scheme of the Corporation, if sanctioned by Parliament, would give an ample supply of water to the whole of Derbyshire, and would confer an enormous boon upon the inhabitants of the borough. Asked by the Chairman whether he apprehended that the smaller authorities in the county would experience the difficulty, delay, and inconvenience in obtaining water under the Derby scheme which had been felt in the past in many other cases, witness expressed the opinion that there would be no greater inconvenience than there had been elsewhere; but he would not commit himself to the view that the insertion of special clauses was necessary to protect the smaller water authorities. Thereupon the Chairman announced, for the benefit of Counsel, that this matter had made a strong impression upon the Committee.

The next witness was Mr. Edgar Hooley, the Notts County Surveyor, who gave evidence in support of the Derby scheme, especially on the ground that it would afford a fresh source of water for Nottinghamshire, where the existing supply from the Trent was, he said, a matter of constant anxiety. There was only one source to which Nottingham could go if their present supply failed, and that was the Derwent Valley. The Notts County Council were satisfied with the terms offered by the Derby Corporation, which would entirely meet the requirements of the county. He was instructed to give this evidence in support of the Derby scheme, and especially to oppose that of the Sheffield Corporation. Dr. J. Scott Taw, formerly Medical Officer of Health for the Barford Rural District, described the water supply of Nottinghamshire as being far from good. To the south of the Trent it was very bad indeed; the inhabitants being entirely dependent upon small streams and wells. Of the three schemes before the Committee, that of the Derby Corporation was undoubtedly the best for Nottinghamshire. Under the Sheffield scheme, the whole of the water would be taken away, leaving none for the county of Nottingham, who would not be able to obtain water from the Derwent watershed without Sheffield's permission. Moreover, Sheffield was outside the watershed. The Leicester scheme would benefit only a small part of the south-west portion of the county, and also the city of Nottingham. Large districts in the north and north-east (including a great many collieries) were increasing very rapidly, and would unquestionably soon require a supply from outside sources; and, in his opinion, the Derby scheme would best meet these requirements. Witness having been cross-examined on behalf of Sheffield, Mr. Hans Hamilton stated that clauses had been practically agreed between the Nottingham County Council and the Corporation of Derby, subject to anything the Committee might decide upon the Sheffield and Leicester Bills. Dr. Handford, the Medical Officer of Health for the County of Nottingham, also testified to the necessity of a further supply of water for the county from outside sources, and expressed a very decided opinion in favour of the additional supply being obtained from Derby rather than through the Corporation of Sheffield or Leicester. Mr. J. L. Francklin, a member of the Notts County Council, gave evidence to a similar effect, and set forth his objections to the Sheffield and Leicester schemes, especially to the former, which was, he said, unsatisfactory to Notts *ab initio*. Without wishing to be uncivil, he could only describe the Sheffield people as poachers and interlopers. He disapproved of a Joint Board, as he thought there would be so much quarrelling upon it that they would never get any water at all. Mr. R. D. Hill Tiddeman, F.G.S., Government Geological Surveyor, was then called, and spoke as to the suitability of the sites selected by the Derby Corporation for their reservoirs and works, having regard to the geological formation of the district, and also explained in detail his objection to the sites selected by Sheffield and Leicester.

The foregoing is an epitome of the proceedings during the first week of the inquiry. The remainder will be dealt with in subsequent issues.

HOUSE OF LORDS COMMITTEE.

(*Before the Earl of* Jersey, *Chairman, the Earl of* Stradbroke, *the Earl of* Dundonald, *Lord* Teynham, *and Lord* Rosmead.)

RAWTENSTALL WATER BILL.

This Bill, which was promoted by the Corporation of Rawtenstall to sanction the severance of the borough from the water limits of the Corporation of Bury, and to authorize the construction of water-works, the purchase of the mains and other works belonging to the Corporation, and the raising of the necessary money, came before the above-named Committee on the 1st inst.

Mr. Balfour Browne, Q.C., Mr. Freeman, Q.C., and Mr. Hutchinson appeared for the promoters. The petitioners against the Bill were: The Earl of Derby, represented by Mr. Pember, Q.C., and Mr. Harper; the Bury Corporation, by Mr. Pope, Q.C., Mr. Pembroke Stephens, Q.C., and Mr. Ram; and the Corporation of Haslingden, by Mr. Worsley Taylor, Q.C., and Mr. Knox.

In opening the case, Mr. Balfour Browne stated that the borough of Rawtenstall comprised 9528 acres, contained a population of 33,000, and had a rateable value of £115,142. He recounted the history of the water supply from 1853, when it was furnished by the Haslingden and Rawtenstall Water Company, who were bought up by the Bury Corporation in 1873. At that time there was no Corporation to guard the rights of Rawtenstall; otherwise they could not conceive that the Bill authorizing the transfer of the water supply to Bury would have been allowed to pass. They would have had the clause which had been inserted in every Act since 1876, giving outside districts the right of separating themselves from the internal districts upon paying for the mains and reservoirs. He was sorry to say that the water supplied by Bury was very bad. It was condemned by the Inspector of the Local Government Board, by medical officers, and by public opinion. Bury obtained power in 1872 to build the Ogden reservoir and construct filter-beds, and they had fifteen years to do it in. In 1885 they asked for another ten years; and yet it was not built. To-day Bury wanted to supply Rawtenstall with water at a much higher rate. In the Bury Bill of last year, the Committee of the House of Commons inserted a clause providing that the passing of the Act should not prejudice any future application which Local Authorities within the water limits might be desirous of making. That Bill was dead; and their Bill this year was totally different. The Rawtenstall area was 60 per cent. larger than that of Bury. Bury would be gainers rather than losers by the severance, for they would be paid the full value of their pipes and apparatus. There could not be any loss; and if any damage were done to works taken over, ample compensation would be paid. It would require a rate of only 1d. in the pound, whereas the Bury Corporation scheme, which proposed an increase of 33 per cent. in the rate, would require 3d. in the pound. They had assented to the principle of a Joint Board; and if equitable terms could be arranged, Rawtenstall would be willing to do nothing for a year.

The first witness called was Mr. James Diggle, Water Engineer to the Heywood Corporation, who described the present water supply as seriously polluted. He said it was a physical impossibility for the present works to supply Rawtenstall, on account of the level of the reservoirs. The Bury Corporation were at present a quarter-of-a-million gallons deficient in water from the wells. The scheme of the promoters would cost in all £140,000; whereas the rival scheme of the Bury Corporation would cost £400,000 for getting only the same quantity. The scheme provided for a supply for the next thirty years at 25 gallons per head per day. In cross-examination by Mr. Pembroke Stephens, witness said that, in his opinion, the Ogden reservoir ought not to be made, although it might be the case that recent scientific surveys had established the possibility of constructing it. He was sure of this, however, that any engineer who had had to deal with similar difficulties would never enter upon it. He had now to do with a reservoir made in 1845 in exactly the same formation of soil, and since then hundreds of thousands of pounds had been spent, without success, in trying to put it right. Experience of this kind made engineers very careful.

Mr. Diggle was followed by Sir E. Frankland, who was examined as to the respective merits of the Bury and Rawtenstall schemes. He said he had no hesitation in recommending the latter as superior to that of Bury, and added that there were great advantages in Rawtenstall having a supply of its own. In cross-examination, he said the Bury water could be made better by filtration, but could not be made very good because of the large proportion of peaty matter. It would be an advantage to have a Joint Board, but it would not do to have too many Local Authorities upon it.

Professor Boyd Dawkins expressed the opinion that the site of the proposed reservoir was admirably adapted for the purpose.

The Mayor of Rawtenstall (Mr. E. W. Trickett) stated that during the past seven years there had been constant complaints about the water supply, both as regards pressure and quality, especially the latter. The general opinion was that, even if they had to pay a little more, a scheme of their own was preferable to continuing under the present system. Many large users of water would not, under any circumstances, take Bury water, but had private supplies, and these people would have water from Rawtenstall if Parliament sanctioned the scheme. The public meeting called to consider it was one of the most enthusiastic and unanimous ever held in the town. In cross-examination, witness admitted that the present supply from Bury cost £3350, whereas the Engineer's estimate of cost of the new scheme was £7295. This difference of £4000 did not, however, alter his opinion as to the necessity of the scheme, if it resulted in getting a pure and full water supply. His idea was that affairs would not be better but worse, if managed by a Joint Board, which, he thought, would be unmanageable. He admitted that the proposed Board would consist of only 9 members nominated by Bury, and 13 from outside districts, which would therefore have a preponderance.

The Medical Officer of Health for Rawtenstall (Dr. M'Naught) and Mr. E. Ashworth, J.P., a resident, testified to the advantage that would accrue from the supply of water being under the control of the Municipal Authority. The Borough Surveyor (Mr. A. W. Lawson) described the proposed works; Mr. Baldwin Latham gave detailed evidence as to rainfall, &c.; and Mr. R. E. Middleton bore corroborative testimony to

the feasibility of the scheme, and the entire suitability of the works. The effect of the proposed severance would be that a quantity of water would be liberated for the use of Bury, which would enable them to postpone the construction of works; and this would be a financial advantage. The present Bury supply was only just sufficient for the population.

The proceedings noticed above occupied the Committee till Tuesday afternoon. On the following morning, Mr. Hutchinson stated that there were several local witnesses who would state that they would be prepared to abandon the private supplies they now used in preference to the water from the Bury undertaking, and take water from the Rawtenstall Corporation should the Bill pass. The Chairman intimated that one witness of this kind would be sufficient; and Mr. Peter Moore, a builder and contractor, gave evidence to the effect indicated by Counsel.

Their Lordships then consulted in private; and the Chairman, subsequently addressing Mr. Pembroke Stephens, said the Committee did not call upon him to address them, as they did not feel satisfied that Rawtenstall had made out a sufficient case for going outside their own area and taking water from Scout Moor and constructing works there. The preamble of the Bill, therefore, was not passed.

BURY CORPORATION WATER BILL.

The Committee next proceeded with the consideration of this Bill, which was promoted by the Bury Corporation to obtain authority to construct additional works, increase water-rates, and raise further capital.

Mr. Pope, Q.C., Mr. Pembroke Stephens, Q.C., and Mr. Ram appeared for the promoters; Mr. Balfour Browne, Q.C., Mr. Freeman, Q.C., and Mr. Hutchinson represented the Corporation of Rawtenstall, who petitioned against the Bill.

In opening the case, Mr. Pembroke Stephens said it would be obvious to their Lordships, from the extent of the district and the number of Local Authorities involved, that it was one which in the past had been difficult to administer. There had been an inquiry by the Local Government Board, and the Inspector had reported in favour of vigorous and prompt action to cope with the state of things that had arisen. One of the reasons was that neither the Corporation of Bury nor the outside Authorities had the power of suppressing the evils complained of. Therefore it happened that a state of things had grown up which was very much to be regretted, but in regard to which neither side was entitled to claim that it was entirely clear in the matter. Last year, the Bury Corporation introduced a Bill with various objects—among them being the very costly and effectual plan of buying up the whole of the lands round about their streams and reservoirs on which there was a probability or a possibility of pollution; in other words, they sought control of the entire watershed. This had been done in many cases, notably on a very large scale in Leeds. It was very costly, but very efficient, and it involved an outlay of £200,000, and threw great responsibilities upon the Managers of the water-works undertaking. This expenditure was not for the benefit of Bury alone, but of the whole district; and provision was made for an increase in the rates and charges, which were authorized as far back as 1852 and again in 1872. These rates and charges were in no sense equivalent to the circumstances of to-day, and provision was therefore made for the extra means without which those existing would have been inadequate. The Bill was most hotly opposed; and when it was brought before their Lordships' House last year there were no less than 25 petitions against it. In some cases arrangements were come to; and ultimately the House passed the Bill both as to the land and as to the increase of rates. When they got into the second House, the opposition was renewed, though not by all the petitioners. Then an important point arose—viz., that the Local Authorities wanted a voice in the management and ownership of the works. And there was the further question: Supposing this were granted, on what terms, and in what manner, was it to be done? In the multiplicity of counsels there was not always wisdom. A clause was finally settled that Bury was to go on paying the sinking fund on the debt, and that when the fund was fully paid up the profits of the undertaking were to be used for the benefit of all the districts. This was rather an extraordinary outcome, because while the sinking fund was being paid it was a private undertaking, and when it was fully paid up they had not any property at all. The obligations put upon them were such that they could not accept the Bill in that shape. It was with great reluctance that they took this position, seeing that in the second House, as in the first, the purchase of additional lands and the construction of filtration works, as well as the increase of the rates, were approved. If it had not been for this unfortunate miscarriage, probably the controversy of the present year might have been avoided. The Bury Corporation, still loyal to their idea of carrying out the recommendations of the Local Government Board, brought forward their Bill of this session. It authorized them to construct the Ogden reservoir and lay down pipes leading to the Black Car reservoir. Besides this, it authorized them to construct a reservoir at Slates; and there would be pipes connecting those with the existing Clough Bottom mains of the Bury Corporation. These were the new works the Corporation asked the Committee to sanction. In addition, they took powers in the Bill to purchase the whole of the land in the separate watersheds, for the protection of the gathering-grounds from pollution. They also proposed, in obedience to the decision of Parliament last year, to construct filters. As these would be heavy and onerous pieces of construction, they proposed to increase the maximum rates and charges; and for the convenience and simplicity of calculation, it would be a rise of 33⅓ per cent. all round. Of course, they also required to borrow money for these several purposes, in the usual way. This, on the whole, was the Bill they had introduced. Their Lordships would see that a great many of last year's questions were raised again; and both the Corporation and the outside districts felt that if an understanding could be established as to the water charges and other matters, it would save much time, expense, and difficulty, which everybody felt last year were burdensome. Accordingly, conferences were held between the outside Authorities and the Corporation, as to whether, in the first place, the charges would be increased by 33⅓ per cent. or some other figure, or whether there was not some alternative course of meeting the difficulty.

At this point, Mr. Hutchinson, on behalf of the Rawtenstall Corporation, said he had had an opportunity of conferring with his clients with regard to the Bill, which the Corporation of Rawtenstall had petitioned against. Having regard to the whole circumstances of the case, and particularly the proposition of the Bury Corporation to come forward next year with a Bill, constituting a Joint Board, his clients thought they would rather be left with free hands to do what they liked next year, if they saw it was necessary to fortify their position, than commit themselves now by taking part in any discussion before their Lordships.

Mr. Pembroke Stephens said he quite followed what his learned friend had said. The Rawtenstall Corporation had exercised a wise discretion. At the same time his friend had an opportunity now of knowing all that was proposed in the present Bill. This relieved him (Mr. Pembroke Stephens) from the necessity of saying more than a few words, because the Rawtenstall Corporation were the only opponents of the Bill. He would simply tender formal evidence, and would not trouble their Lordships more. An agreement had been come to as to the constitution of a Joint Board. All the Local Authorities accepted it, with the exception of Rawtenstall, who, if eventually they made up their minds to oppose it, could do so next year. Rawtenstall had the same rights as anybody else. This was shortly the position. Bury had not originally asked for a Joint Board; but it was very much discussed last year, and Bury, in loyal regard for the requirements of the situation, agreed. What was fair for all the other Authorities could not be unfair for Rawtenstall, who he hoped would find it the best and wisest course to agree also. The agreement recited that the Bury Corporation should next year promote a Bill for the constitution of a Joint Board, to consist of representatives appointed by the respective Councils of the boroughs of Bury, Haslingden, and Rawtenstall, the respective Urban District Councils of Radcliffe, Ramsbottom, Little Lever, and Whitefield, and the Rural District Council of Bury; and for the acquisition by such Board of the water-works undertaking of the Bury Corporation. In the present Bill, the Corporation of Bury accomplished everything desired by the Local Government Board. He ventured to think that the Corporation had made a very great sacrifice of what was to them a matter not only of possession but of pride; but what they did was in the interests of the people. It was desired by everyone, and he hoped Rawtenstall would consent. He therefore asked their Lordships to pass the preamble of the Bill, which was practically an unopposed measure.

The Chairman asked if, after the Joint Board had been constituted, the works would be the property of all the Local Authorities; and Counsel said they would—Bury and Rawtenstall being included.

The Town Clerk of Bury (Mr. J. Haslam) was then called, and offered to give the Committee any information they desired. In answer to questions, he said the Bury Corporation could supply the greater part of Rawtenstall. The highest portions of the town consisted of agricultural land, and the conditions were such that even if they offered to supply the areas the people would not have it. They would never be able to pay for the mains. The population was very scattered, and the cost would be ruinous. Some of the houses were miles apart. It was true that some of the highest houses were in the streets; but they could be supplied by the existing main from Clough Bottom, the level of which was fully 960 feet. The highest houses they were asked to supply in Rawtenstall were about 850 feet above the sea-level. Bury would have no preferential rates over the other districts; all would be upon the same level. There was one small exception in the southern portion of the area. Manchester and Bury were competing water Authorities, and Bury was bound to supply at the same rate as Manchester. Since last year, the Corporation of Bury had bought a number of farms on the gathering ground at a cost of between £60,000 and £70,000. The total area was about 5000 acres. Formerly they had powers of purchase by agreement only, and they found that some people were difficult to deal with. They now asked for compulsory powers of purchase. They wanted to have absolute authority over the gathering grounds.

The next witness was Mr. J. Cartwright, the Water Engineer. He said he had a complete knowledge of the works, and had constructed one or two of the later reservoirs. Asked his opinion as to the Local Government Board's suggestion that ten years for the construction of the works was too long, and should be reduced, witness said they now asked for ten years. This length of time was necessary on account of difficulties connected with the levels. Extraordinary conditions prevailed. The object of the clause was certainly not to delay the work, but simply to guard against possible difficulties.

After some further conversation, the Committee passed the preamble of the Bill.

Divining for Water.—The process of divining for water was lately put in operation at Partick and at a brewery near Newport (Mon.). In the first case, the diviner predicted an abundant supply of water at from 100 to 150 feet depth, and a supply of more than 60,000 gallons per day has been tapped at 110 feet—the water rising 13 feet above the surface of the ground. At Newport, he said a supply of 1000 gallons per hour would be found at 300 feet deep; and 1200 gallons per hour have been tapped at 285 feet.

Coventry Corporation Gas and Electricity Supply.—There was a very small difference in the output of gas at Coventry during the year ending March 31 last, compared with the preceding year. The quantity made during the past financial year was 504,602,000 cubic feet; while in 1897-8, it was 504,639,000 feet—a decrease of 37,000 feet, or 0·007 per cent. The number of consumers, however, increased at a splendid rate. On March 31, it was 7713, as against 7095 at the corresponding date last year—an increase of 618, or 8·71 per cent. The electric light undertaking scored a very small increase in consumers; the number being 135 on March 31 last, as compared with 112 at that date in 1898.

Testing Gas-Meters in Manchester.—The annual report of the Official Inspector of Gas-Meters in Manchester states that 36,839 meters of all classes were tested during the last twelve months; this being the largest number on record, and 7931 more than in the preceding year. The fees charged were £1124, as against £889 a year ago; and the cash statement shows a credit balance for the second year in succession, amounting to £217. Of the total number of meters tested, 426 were rejected, or about 1·15 per cent. Since 1862, when the office was instituted, 441,546 meters have been tested; the fees received being £14,058, and the gross expenditure £22,875. Should the work continue to increase, it will be necessary to provide additional accommodation for coping with it.

LEGAL INTELLIGENCE.

COLCHESTER COUNTY COURT.—Wednesday, May 24.

(*Before His Honour Judge* PATERSON *and a Special Jury.*)

Broom v. The Colchester Gas Company—A Question of Liability.

This was the new trial of an action brought by Henry Broom, a labourer, against the Colchester Gas Company, to recover damages for injuries sustained by him while engaged in unloading a barge at the Hythe. His Honour, at the previous hearing, ruled that there was no evidence to go to the Jury; but an appeal to the High Court resulted in a new trial being ordered (*ante*, p. 592).

Mr. C. E. JONES appeared for plaintiff; Mr. E. WILD for the Company.

Mr. JONES explained that the action was brought under the Employers' Liability Act of 1880; and in order to become entitled to a verdict, defendant had to prove certain things. He alleged that the gearing supplied by the Company while he was doing their work was defective; and in particular that a certain wire chain or runner was not sufficiently strong for the duty for which it was employed, or, if it had ever been strong enough, that it had become rusty and worn and defective, and was practically useless. The accident occurred at the Hythe Quay. The Company had a vessel there laden with oil-casks, and they had also a hydraulic crane which was used for unloading barrels. But at the particular time, the crane was engaged unloading other goods alongside the wharf, so that there was no room for the oil-barge to come up to the crane. On the day previous to the accident, plaintiff was at work on the quay, when he saw the captain of the barge in conversation with Mr. H. S. Pike, the Company's Manager; and he heard the captain say, "There's your oil, I have done with it." Mr. Pike said he could not unload it; and it was evident that they were at cross-purposes. Then Mr. Pike asked the captain if he could not rig up some gear so as to unload the oil, and he replied, "I daresay I could;" and at Mr. Pike's request he undertook to see what he could do. Plaintiff then went up to Mr. Pike, and asked if some help would be wanted in the unloading. At first Mr. Pike said no; but about an hour afterwards he sent for the plaintiff, asked him if he would unload it, and what he wanted for the work. Plaintiff asked for 1½d. a cask; but eventually agreed to accept 1¼d. He and a man named Francis got a couple of other men, and started next morning to unload the barge. The gear that had then been rigged up consisted of an ordinary windlass, and a wire rope running down the mast; and it required two men at the windlass, one man in the hold to hook the casks on to the chains, and the other man to stand on the hatchway and swing the casks over towards the quay as soon as they got high enough. But the gear that had been rigged up had no hooks; and these were procured from the gas-works—the four provided being sufficient to lift two casks, each cask weighing 3½ cwts. About four o'clock in the afternoon, plaintiff was on the hatches to receive and guide the casks; but just as the casks came up, the rope broke, one of the casks fell into the hold, the plaintiff fell in too, and both his legs were broken—one of the fractures being a very serious one indeed. He was taken to the hospital; and, although he had the best of treatment, he had been a cripple since, and would be for the rest of his days—one leg being an inch shorter than the other. Counsel contended that the action arose owing to the neglect of the Company's Manager to examine the gear before it was used; for he would then have discovered the condition of the rope, which was rusted through, and had hardly a bright strand in it.

The depositions taken at the previous hearing were then read over to each witness in turn.

Mr. *H. S. Pike* stated that he was under no liability to unload the cargo of oil in any given time. The captain of the barge offered to find the gear if he (witness) would discharge the barrels of oil by hand at once instead of waiting till the crane was at liberty. When plaintiff was engaged to do the work, he was told that the captain of the barge was going to find the gear. Plaintiff unloaded the barrels in his own way, and employed his own labour. Witness did not provide the chains; but they were fetched by someone from the Company's yard. When he saw the men raising two barrels at once, he called to them that he thought the weight was too much for the ropes; but they took no notice, and proceeded with the work, though had he possessed any authority over them he should have forbidden the raising of two barrels at a time. He did not regard the men as his employees at all.

In the course of further evidence, the captain of the barge said he gave direct instructions that the barrels were to be raised one at a time.

Mr. WILD, addressing the Jury, submitted that Broom voluntarily incurred the risk of accident, and was guilty of contributory negligence. The Gas Company were certainly not legally liable.

Mr. JONES replied at some length. Regarding the question of employment, he contended that Mr. Pike exercised control over the men at work raising the barrels; and the fact that Broom was paid by piece work did not enter into the question. It was quite clear that Broom was a workman in the employment of the Company, who had supplied the gear through the captain of the barge.

The Jury found that plaintiff, at the time of the accident, was not a workman in the employ of the Company; that the Company did not agree with plaintiff to find the necessary gear required to discharge the cargo; that the rope used by plaintiff to raise the casks did not form any part of the machinery or plant connected with, or used in, the Company's business; and that the accident arose from the plaintiff using the rope to take up two casks at a time.

Judgment was accordingly entered for the defendants, with costs.

WESTMINSTER COUNTY COURT.—Thursday, May 18.

(*Before His Honour Judge* LUMLEY SMITH, Q.C.)

Grand Junction Water-Works Company v. Passingham—A Question as to a Supply by Meter.

This was an action brought by the Grand Junction Water-Works Company to recover £28 13s. 3d., the balance of a sum of £45 11s. 3d. claimed for water consumed by the defendant according to a meter fixed upon, or for the supply of his premises, Elgin Mews, Notting Hill. The case raised two points which appear never to have been before discussed—one being whether a water company can compel a consumer to have a meter; and the other, whether a meter is *primâ facie* evidence of the consumption.

Mr. R. B. D. ACLAND appeared for the plaintiffs; Mr. LANE represented the defendant.

Mr. ACLAND, in opening the case, said the action was really for £37 2s. 3d.; but £8 9s., and proportionate costs, had been paid into Court. The account was from June 23 to Lady-day last. The point he was raising was a somewhat difficult one of construction. The Company contended that they were entitled, at their own instance, to supply water by meter. The water was not all used for domestic purposes, and the amount charged was in respect of stables.

Mr. LANE: There are a large number of persons living there.

Mr. ACLAND said before September, 1897, there was an agreement by which defendant paid a fixed sum of about £17 a year. The agreement was made in 1881; and the amount was paid up to April, 1898. The Company found that a great deal more water was used than was paid for; and they gave notice that in future the charge would be made according to the meter they would put in. Defendant replied that an agreement existed, and the Company could not alter it. The charge was at the rate of 7½d. per 1000 gallons.

His HONOUR asked if the meter was *primâ facie* evidence.

Mr. LANE said it was; but he had a letter from the Company in which they said that a meter there was impracticable.

His HONOUR asked what would happen if a person had a domestic supply, and used the water for washing carriages.

Mr. ACLAND said if the water were used for any other than domestic purposes the Company would be entitled to charge extra. In the words of section 50 of the Act: "The Company may, at their own instance, or at the request of the consumer, supply and fix a meter." Washing carriages was not a "domestic purpose;" and the Company were not bound to supply any water for it. But they could supply by meter if asked to do so, or at their own instance.

His HONOUR asked, in the event of a consumer saying he did not want a meter, whether the Company could say he must have one.

Mr. ACLAND said that was his contention.

Mr. LANE said it was not at all clear that the Company could force a meter upon a consumer if he objected.

The following evidence was given.

Arthur Percival, a meter inspector in the service of the Company, said the premises were by Ladbroke Grove, and persons lived over the stables. It was an ordinary London mews, with 24 lots of stables in it. He had no reason to suppose the meter did not register correctly.

His HONOUR said he thought it better to hear the evidence for the defence before this witness was cross-examined.

Mr. *G. W. Passingham* deposed that he bought the property in 1880, and paid a yearly rental of £15 for water. There was at that time a family over each stable, and water was used for washing carriages and cabs. Since then he had sold some of the property; but there had been no change in the place except that there were fewer carriages. Notwithstanding this, he was asked to pay £45. From £15 it went up to £21 10s. The Company then said they might charge £31 15s. 6d. There were 61 rooms altogether in the place, and they wanted to charge 2s. 6d. a year for each room; but ultimately it was arranged verbally that £21 10s. should be paid as a permanent fixed rental, and empties were to be allowed for proportionately. Subsequently Mr. Leggatt, the Surveyor to the Company, wrote with reference to a proposal for a meter, and said one was impracticable. This came about because the Company wanted to raise the charge. This went on up to 1897. The rateable value of each place was £14. After a portion of the property was sold, and some was let for stores, the amount was reduced to £16 18s. He never asked for a meter. The Company gave him notice that they were going to fix one. The chances of using water now were less than they were in 1880. Some of the stables had a separate meter; and they used a small quantity of water compared with what the Company charged him for. The mews was flushed from time to time by the parish with water from a plug; but he thought it came from his meter. The drain was also flushed in the same way. There was always leakage going on. He believed the main had been in for forty years. It constantly burst, and this would affect the meter. A new fire-plug was put in only the previous Monday, though it had been leaking badly for two months. There were 44 horses altogether. Part of the water was used for domestic purposes.

Mr. *G. English*, Chairman of the Works Committee of the Kensington Vestry, said he inspected the place on the 15th of May, and found that the main pipe went through the meter, and the fire-plug leaked; but he was told later that a new plug was put in.

Other evidence bearing out these statements having been given,

Mr. ACLAND called the Company's district foreman, who said the plug complained of was a good one, and suggested that the water came from a rain-water pipe close by. A slight leakage would not cause the meter to work. It was the force of the water which moved the meter, and not the quantity.

His HONOUR, after Counsel had addressed him, observed that he was convinced the Company were bound to supply a meter when their main ran by the premises for which it was required; but when the main was not close by they might say they would supply consumers if they paid for a meter. It was clear they could not force one upon a consumer if he would not take it. How did the agreement stand?

Mr. LANE put it that the amount which had been charged by agreement was fair and binding. He was not bound by the section referred to by his friend. A meter could not be forced upon him. He said the Company should supply the rooms used for domestic purposes upon the domestic basis, and the other part of the premises by agreement.

Mr. ACLAND, in reply to his Honour, said he was unable to point to anything which showed that a water-meter was *primâ facie* evidence of the accuracy of the quantity of water used.

His HONOUR, in giving judgment, said he found it unnecessary to decide the point under section 50. As to the agreement, he desired to say that, in his opinion, the County Council had power to put an end to it; and he thought it had come to an end by reasonable notice. The Company then fixed a meter, which they claimed they were entitled to

do under the section named. This section was very involved; but he was not bound to decide whether or not the Company could force a meter upon the defendant. It was clear that the meter recorded more water than could fairly be charged to him. When £16 18s. was fixed, it was with the full knowledge of the circumstances; and the Company had also said it was impracticable to fix a meter there. He had come to the conclusion that this was a fair amount, and he should therefore give judgment for the defendant, with costs.

The Birch for a Youthful Prepayment Meter Depredator.

Walter Hartwell, a boy of eleven years of age, was charged at the Kidderminster Police Court a few days ago with having stolen 2s. from a slot meter, the property of the local Gas Company. The meter, which was fixed at his father's house, was found broken open by an inspector of the Company; and the boy admitted to him that he had forced the money-box open with a poker—investing the proceeds in oranges and other things. On the statement of the boy's mother that he had been suffering from bad legs, the Bench ordered that, subject to the approval of the medical attendant, the young offender should receive four strokes with the birch rod.

A Case Under the Workmen's Compensation Act.

The question of the compensation of the dependents of the workman James Callaby, who, as mentioned in our editorial columns on the 4th ult., died through injuries sustained at the Beckton station of The Gaslight and Coke Company, was recently arbitrated upon by his Honour Judge French, at the Bow County Court. The Company did not dispute their liability under the Workmen's Compensation Act, and stated that the amount of Callaby's earnings for the three years prior to his death had been £293. The representatives of the deceased agreeing to this figure, the case was only referred to the Arbitrator for decision as to the apportionment of the compensation; and his Honour directed that one-third of the agreed amount should be handed over to the widow, and the remaining two-thirds paid to, and invested by, the Court for the benefit of the orphans of the deceased man.

Pipe-Laying Excavations at Holiday Times.

At the Palatine Chancery Court, sitting at Liverpool last Friday week, Mr. Mansfield, on behalf of the Morecambe District Council, applied to the Vice-Chancellor for an order to restrain Mr. Escombe, their contractor for laying a water-main along the principal thoroughfare of Morecambe, from proceeding further with the excavation between May 19 and June 2, and also requiring him to fill up the present excavation. He pointed out that the contract provided for a suspension of the work at the Council's discretion. Mr. Maberly, for the defendant, said he agreed not to proceed further with the excavation; but he declined to fill it up, as the excavation in that case would have to be remade. Mr. Mansfield said the Council regarded the work and the state of the street as so great a nuisance during the holidays that, failing an order, they would fill it up at their own risk. The Vice-Chancellor said he could not make an order to fill up without going fully into the case. Mr. Maberly had undertaken not to proceed further with the excavation; and the Council must take their own course as to the rest.

Bury Corporation Gas-Works Profits.—At a recent meeting of the Gas Committee of the Bury Town Council, it was reported that the working of the Department during the past twelve months had resulted in a profit of something like £4590. In accordance with the Act of Parliament, the Committee recommended that one-half of this sum should be transferred to the Corporation in relief of rates, and that the remainder should be returned to the consumers in the form of an extra 1d. per 1000 cubic feet discount on all gas accounts paid within a specified period.

Malta and Mediterranean Gas Company, Limited.—The accounts of this Company for the year ending the 31st of March, which will be presented at the general meeting on the 13th prox., show an increase of revenue from gas-rental and residual products. On the other hand, the cost of coal has increased. From the balance at disposal, the Directors recommend the declaration of the usual dividends upon the first and second preference capital, and a dividend of 4 per cent. upon the ordinary capital; making, with the interim dividend of 2 per cent. paid in December last, 6 per cent. for the year, and leaving a balance of £815 14s. 9d. to be carried forward.

Portsmouth Water-Works Company.—According to the report which the Directors of this Company presented at the half-yearly meeting on Thursday last, the balance on the profit and loss account for the six months ending the 31st of March was £22,708, out of which the payment of the full statutory dividends was recommended. After deductions for the void houses, &c., this left a balance of about £7430 to be carried forward. During the half year, 1539 yards of additional street service mains were laid in new roads; making a total of about 46 miles of trunk mains and 124 miles of service mains. The number of additional services connected with the mains during the half year was 459; making the total number of premises now under constant supply by the Company in all the districts 38,873. The quantity of water pumped from Havant and Bedhampton during the period covered by the report was 1,156,743,000 gallons, or an average daily supply for all purposes of 6,355,000 gallons; being a decrease of 167,000 gallons daily, as compared with the corresponding period of last year. The quantity supplied for domestic use was equal to an average of 25 gallons per diem per head of the population, exclusive of all supplies by meter. The number of fire hydrants now fixed in the Company's districts is 3055. The Engineers (Messrs. J. Quick and Son) reported that the Company's engines, boilers, reservoirs, and works are in good order. The Chairman of the Company Mr. W. Grant, J.P.) moved the adoption of the report; and the motion was carried unanimously.

MISCELLANEOUS NEWS.

LEEDS CORPORATION GAS SUPPLY.

A Gratifying Increase in Profits.

At the Meeting of the Gas Committee of the Leeds Corporation last Friday, the City Accountant (Mr. Derry) presented a statement of the revenue account for the year ended March 25, which showed that the profits on the undertaking had been £37,448. Out of this £14,677 was set apart for the reduction of debt, leaving a surplus balance of £22,771. During the previous year, the profits were £12,231; so that in the year recently closed there has been an increase of £10,540, which is the more satisfactory, inasmuch as the price of gas was 2d. per 1000 cubic feet less during the three months of the present year. The sum said to be represented by this reduction for the term indicated is put down at £7000; so that, if the reduction had not taken place, the profits would have been greater by this amount. The expenditure on capital account during the year was £68,249—making the total outlay on the undertaking £1,406,675. It is satisfactory to know that no less a sum than £327,537 of this amount has either been paid off or invested in the sinking fund for the purpose. The Committee also had under consideration the amount of profit to be paid to the gas-works depreciation fund, which was formed some months ago. It was almost unanimously decided that, subject to the approval of the Council, £10,000 should be paid into the fund; raising it to £20,000.

STAFFORD CORPORATION GAS SUPPLY.

The Accounts of the Gas Department for the Past Financial Year.

The Gas and Electricity Engineer of the Stafford Corporation (Mr. John Ferguson Bell, Assoc.M.Inst.C.E.) has forwarded his analysis of the accounts of the Gas Department for the year ending the 31st of March last. The capital engaged in the supply of gas at that date amounted to £68,766, which is at the rate of £4 10s. 4d. per ton of coal carbonized, and 10s. per 1000 cubic feet of gas sold. The amount expended on fixed plant account was £104,850, less £33,817 written off by loans repaid; leaving a net sum of £71,033. The net cost of coal (£7265, less £4478 received for residuals) was £2786. The manufacturing expenses were £3788; distribution cost, £606; management, £362; and the total working expenses were £7318. The coal and working expenses, less residuals, came to £10,104; and as the sale of gas produced £18,364, there was a profit of £8260. Adding the profit made from gas-fittings, £244, this sum was brought up to £8504, from which had to be deducted income-tax and interest, &c., £5646; leaving a net profit of £2858. The balance brought forward was £4; making a total of £2862. The foregoing items work out as follows per 1000 cubic feet of gas sold: Coal (12·71d. less 7·83d.), 4·88d.; manufacturing expenses, 6·63d.; distribution, 1·06d.; management, 0·63d.; total working expenses, 12·81d. The amount received from the sale of gas works out to 32·14d. per 1000 cubic feet; the coal and working expenses, less residuals, to 17·69d. Deducting depreciation (1·83d.), profit on gas-fittings (0·43d.), and lamplighters' wages (0·61d.), amounting to 2·87d., the net cost of gas is 14·82d. per 1000 cubic feet sold. With regard to the working, 15,223 tons of coal were carbonized, and 150,114,000 cubic feet of gas made, of which 137,130,000 cubic feet were sold, and 12,689,000 cubic feet used on the works and lost by leakage &c. The make was at the rate of 9861 cubic feet, and the sale 9009 cubic feet per ton; the sales of residuals, on the same basis, being 9¾ cwt. of coke, 11¼ gallons of tar, and 22 lbs. of sulphate of ammonia. The net proceeds of the residuals came to 62 per cent. of the cost of the coal.

When the accounts were before the Council at their last ordinary meeting, Mr. Wright said he believed the net profits were more than they had ever been in any single year since the town acquired the gas-works. The consumption of gas amounted to just over 150 million cubic feet sold to private consumers, which was an increase of 4 millions compared with the previous year. Although they had the electric lighting works, the consumption of gas went up year by year; and there was every likelihood that it would continue to do so. Coals had cost more by £540. He was sorry to say that during the present year they would have to pay 1s. 6d. per ton more for their coal; and, as the quantity used was something like 16,000 tons, it was a serious matter. This year they had done very much better with residuals. The capital of the works was now £71,000; and supposing the undertaking had been owned by a company, the directors would have been able to pay a dividend of 13 or 13½ per cent. The gas-works had contributed to the relief of the rates the sum of £32,350 since they had been owned by the Corporation.

THE QUALITY OF THE CAMBRIDGE COMPANY'S GAS.

What at first sight appeared to be a somewhat alarming report on the quality of the gas supplied by the Cambridge University and Town Gas Company was submitted by the Lighting Committee from the Gas Examiner (Mr. Pain) at the last meeting of the Town Council. Mr. Pain reported the results of his tests made during the quarter ending March 31. It appeared therefrom that in January the average illuminating power of the gas was 14·8 candles; ten of the 53 observations made being below the standard, and three as high as 16·2 candles. In February, 59 observations gave an average of 14·68 candles; eight readings being below the standard, and three as high as 15·6 candles. In March, 66 observations gave an average of 14·32 candles; eighteen readings being below the standard. One was as high as 16 candles, nine were below 13 candles, and two of these were below 12 candles. Mr. Pain reported that 36 readings during the quarter were below the standard contracted for, distributed over nineteen days; and, with the exception of the 3rd of December last year, he ascertained, on referring to the registers, that he had to go back to Nov. 16, 1880—a period of over eighteen years—to find an instance of the gas supplied to Cambridge being at all below the standard illuminating power of 14 candles. The

Committee forwarded the report to the Gas Company's Engineer and Manager (Mr. R. Brown), who laid it before his Directors. He was instructed to reply that the results obtained by Mr. Pain did not in any way agree with the tests made by the Company's officials. Mr. Brown expressed his willingness to give the Committee any information they might desire; and, to enable him to go fully into the matter, he asked to be informed upon the following points: (1) What apparatus was used to test the illuminating power? (2) What were the dates and times of the alleged failures? (3) Were the results corrected for temperature and pressure? In reply, Mr. Pain said the jet photometer was the instrument used to test the illuminating power, and it had been several times compared with the bar photometer at the Guildhall, and also on many occasions during the quarter with readings taken by officials of the Company. The dates and times were recorded in the register; and the readings below the standard were marked with red ink. The time was recorded on the 24-hour system, to obviate using a.m. and p.m. The results were not corrected for temperature and pressure. Mr. Pain pointed out that these corrections were only applicable to readings on the bar photometer, which was the property of the Company, and was not fitted with the requisite appliances, nor were such corrections required in any of the Company's Acts, or in the Gas-Works Clauses Acts. The adoption of Mr. Pain's report was moved by Mr. Tillyard, who characterized it as "very unsatisfactory." He said he did not propose that any further action should be taken at present, as matters were in a state of transition. They had a system of testing under the old Act, and there would be another under the new one, which had passed all but its final stages, and might be expected to come into operation next month. It seemed, therefore, hardly worth while to commence legal proceedings against the Company, who, he hoped, when they obtained their new capital, would expend it to advantage, and give the town a better supply of gas. Mr. Negus seconded the motion, and it was carried.

The course adopted by the Corporation may be regarded by them as a magnanimous one. But before they talk of "legal proceedings" they should see that their Gas Examiner is testing the Company's gas under the proper conditions. He is a chemist in the town, and the apparatus he uses—a jet photometer—is fitted up in his shop. We do not for a moment question Mr. Pain's ability as a photometrist, but we cannot see the justification for returning the quality of the gas as two candles less than that instrument indicates, as he appears to do. Moreover, he records the tests made by it at all hours of the day and night. The gas is continually being examined by the Company's Manager and his assistants by means of the apparatus prescribed; and the average results of these tests show the real illuminating value of the gas to be 2½ candles higher than that returned by the Corporation Examiner, although the tests were carried out at a point a mile-and-a-quarter from the works. Adding this difference of 2½ candles to the results arrived at by that gentleman, it will be seen that the Company have supplied 17-candle gas, their present standard being 14 candles. The Company only ask that the gas shall be tested in accordance with their Private Act and the Gas-Works Clauses Act, 1871; and we think if this were done by the Official Examiner, his reports would not justify the use of such terms as those employed by Mr. Tillyard. This gentleman referred to a new system which was to come into operation with the Company's Act of the present session. As a matter of fact, there will be no different method of testing the gas under this measure, but simply an alteration of the burner; the 15-hole burner giving place to the No. 1 "London" argand. The Committee, as Mr. Tillyard intimated to the Corporation, have "got their eye on the Company;" but the latter do not tremble beneath their gaze. They are conscious that they are acting straightforwardly by the Corporation and the consumers; and they only desire to be fairly dealt with in return. It is to be hoped that the gas supply of Cambridge under the new conditions to be established by the Act which will soon become law, will give satisfaction to all parties concerned.

WEST BROMWICH GAS DEPARTMENT.

The Annual Report and Accounts.

The report and statement of accounts in connection with the West Bromwich Corporation Gas Department for the year ended March 31 last have just been issued by the Secretary (Mr. T. Hudson). The report states that the loan indebtedness stands at £182,441, compared with £184,049 twelve months ago. The actual capital employed on the 31st of March was £7 0s. 9d. per ton of coal—a reduction when compared with the previous year, but still an average much beyond that of many other gas undertakings in the United Kingdom. The income from sales was again satisfactory; being no less than £2515 in excess of the previous year, or equivalent to an increase of 7½ per cent., notwithstanding the fact of a reduction in the price of gas during three quarters of the year, representing a loss of income of £860. The greater part of the increase, as in the previous year, was due to the continued growth of the prepayment meter system. The number of these meters fixed during the year was 1873; making a total of 4120 to date—a number rapidly approaching that of the ordinary meters in the borough. The income from prepayment meters was £4389, collected from the meters in bronze coins, which weighed 9 tons 16 cwt. The total number of consumers of all kinds at the end of the year was 9019—an increase of 1730. The special scale of prices for gas for motive power purposes was in operation throughout the year, and undoubtedly contributed to increased sales. The total quantity of gas used by private consumers and for public lighting was 272,272,700 cubic feet, against 248,439,700 cubic feet for the previous year—an increase of 23,833,000 cubic feet, or 9½ per cent. The income from residual products showed, with the exception of tar, a satisfactory improvement. The income from gas-fittings and stoves, and work done in connection therewith, fell off in comparison with the previous year; but the latter year was abnormal. The income from all sources was £46,456—an increase of £3695. The total expenditure on trading account was £34,153—a rise of £4265. The aggregate manufacturing charges amounted to £22,879; being £3324 more than in the year 1897-8, which is equivalent to a cost per ton carbonized of 17s. 7·90d., against 16s. 6·85d.—an increase of 1s. 1·05d. per ton. The workmen's wages were fractionally higher per ton of coal carbonized. The net cost of coals, after deducting the value of residuals, was somewhat more favourable than in the preceding year. The value of residuals represented 74·54 per cent. of the cost of coals, compared with 72·29 per cent. in 1897-8, and 70·15 per cent. in the preceding year. The quantity of coal and cannel carbonized was 25,913 tons—an increase of 2320 tons. The percentage of cannel used was 3·98, compared with 2·47 per cent. in the previous year. The average quantity of gas produced per ton of coal and cannel combined was 11,107 cubic feet—practically the same as before. The cost of distribution, including repairs and maintenance, was £3548—an increase of £768 over the previous year, although the cost of maintenance, &c., of meters was £191 lower. Salaries and wages were £176 in excess of the previous year, owing to the larger staff now required in connection with the prepayment meters. The maintenance and repair of mains and services cost £783 more than in the previous year, which is accounted for to some extent by the number of prepayment service-pipes laid and other charges. The cost of public lighting (exclusive of gas) was £155 more than in 1897-8. The number of public lamps in the borough at the close of the financial year was 977—an increase of 20. The public lighting was always carried out at a loss to the Gas Committee; but the prices charged to the Lighting Committee were based upon those prescribed in the Act of Parliament. The gross profit on the trading account was £12,303, against £12,873 in the previous year—a decrease of £570. It was equivalent to a return of 6·74 per cent. on the capital employed. After making the usual payments for interest and other charges, there remained a surplus of £3779, against £4330 before, or £551 less. The surplus will enable the Committee to make the contribution of £2000 to the general district rate already promised; but the amount to be carried to the depreciation fund will be reduced from £2500, as in the previous year, to £1750. The total outlay on prepayment meters up to the end of the financial year was £15,800. The demand for gas did not show any diminution. Mr. Hudson points out, however, that the price of coal is considerably higher than it was twelve months ago, and an advance may be looked for in the next contracts. This will be met to some extent by the enhanced value of coke and ammoniacal liquor. The market for tar, on the other hand, is very depressed. West Bromwich is now within measurable distance of being supplied with the electric light; and it behoves the Committee to meet the competition not only with an article at a moderate price, but also of the best quality. Reference is made, in conclusion, to the loss the gas undertaking sustained during the year by the death of Alderman R. Farley, who was associated with it from its inception, and was Chairman of the Gas Committee for a period of seventeen years.

BUXTON GAS SUPPLY.

The Financial and General Position of the Gas Undertaking.

At the Meeting of the Buxton Urban District Council on the 5th inst. the Chairman (Mr. J. Willoughby) called attention to a statement prepared by Mr. Pearson, the Council's Accountant, on the accounts for the year ending March 31, compared with those for the preceding twelve months. With regard to those relating to the gas-works, the income was £14,665, against £14,026 for the year 1897-8; showing an increase of £639. But the expenditure was £12,978 (including £2669 for interest, repayment, &c.), compared with £12,357 in the previous year, or an increase of £621. This was accounted for by the renewal of machinery at the works. The profit for the year amounted to £1687, which, with the balance brought forward, made £6241. From this there had to be deducted the amount to be transferred to the general expenditure for concreting the river bed, and other items; leaving a balance in hand of £4227. At a subsequent meeting of the Council, the Gas Engineer (Mr. G. Smedley) submitted his annual report, which opened with the satisfactory announcement of a very considerable increase in the consumption of gas. The quantity produced, as registered by the station meter, was 93,494,900 cubic feet; distributed to consumers, 82,720,900 feet; burnt in public lamps, 6,599,100 cubic feet; used in works, offices, shops, &c., 1,665,800 cubic feet—leaving 2,509,100 cubic feet, or 2·68 per cent., not accounted for. The coal carbonized was 4378 tons 16 cwt.; cannel, 4164 tons 17 cwt.—total, 8543 tons 13 cwt. The average production of gas per ton of coal was 10,937 cubic feet, and 10,242 cubic feet were distributed per ton. The average cost of gas into the holders, after deducting the value of the residuals, was 10·79d. The cost of coal was £5623 19s. 6d.; the average being 13s. 1d. per ton. The cash entered in the rental and estimated for lamps was £11,385 10s. 5d. Comparing these figures with the report for the year 1897-8, there was an increase of 7,457,100 cubic feet of gas produced and 8,146,100 cubic feet distributed; being at the rate of 7·97 per cent. on the former and 8·71 per cent. on the latter. The increase in the cash in the rental, &c., was £639, and the cost into the holders was 0·11d. less. The number of meters fixed was 241, and of those removed 168; leaving an addition of 73 consumers. There were 60 cookers fixed and 35 removed during the year—an increase of 25; the total number on hire being 364.

HEYWOOD CORPORATION GAS SUPPLY.

The Gas Manager's Report.

In the "Journal" for May 16, we briefly recorded the result of the past year's working of the gas undertaking of the Heywood Corporation. We have since received the report made by the Manager (Mr. W. Whatmough) to the Gas Committee. He states that there has been an additional expenditure of £1646 on capital account, principally for the erection of new store-rooms and stables, and the laying of additional mains. The gross revenue for the year was £19,163; and the gross expenditure, less interest and sinking fund, £12,620—leaving a gross profit of £6543. The net profit amounted to £1638, which the Committee have resolved to dispose of as follows: Reserve fund, £259; contribution in aid of rates, £1379—total, £1638. The receipts from gas sold for all purposes came to £15,509; being a decrease of £42, due to the reduction of 2d. per 1000 cubic feet in the price last September. The total amount received for

residuals was £3414, or £389 more than in the year 1897-8, due to the increased amount realized by the sale of coke and sulphate of ammonia. The receipts for tar decreased by £81, consequent upon the fall in the contract price of this product. In the coal and cannel account there was an increased expenditure of £246, due to the larger quantity of coal carbonized and the higher cost of coal. There was a decreased expenditure of £239 for the repairs and maintenance of works, principally consequent upon the retorts and furnaces not requiring renewals to the same extent as in previous years. During the year, 742 tons of cannel and 10,844 tons of coal were carbonized—a total of 11,586 tons; the gas made per ton of coal being 10,240 cubic feet, against 10,296 cubic feet for 1897-8. The total quantity of gas manufactured was 118,645,000 cubic feet—being an increase of 4,466,000 cubic feet, or 3·91 per cent; the total quantity sold was 109,487,611 cubic feet, a rise of 3,976,046 cubic feet, or 3·76 per cent. The quantity of gas not accounted for was 7,735,789 cubic feet, against 7,832,735 cubic feet in the preceding year; representing a leakage of 6·52 per cent., compared with 6·86 per cent. for 1897-8. The following figures show the meters, &c., in use:—

	1897-8.	1898-9.	Increase.
Meters	4946	5285	339
Public lamps	826	868	42
Gas-stoves on hire	478	497	19
Do. purchased	88	97	9
Grillers and burners on hire	1313	1684	371
Gas-engines	32	38	6
Prepayment meters	192	265	73

The maximum quantity of gas delivered in 24 hours was on Dec. 22, 1898, 832,000 cubic feet, compared with 732,000 cubic feet the previous year; showing an increase of 100,000 cubic feet. The minimum quantity was 86,000 cubic feet, on June 6, 1898, as compared with 97,000 cubic feet in 1897, or a decrease of 11,000 cubic feet. During the year, there was again a large demand for grillers; the total number of these appliances and stoves in use being 2278—an increase of 399. Appended to the report are a series of tables, the last of which shows the capital expended, &c., from 1881 to 1899 inclusive. In the first-named year, the amount was £62,689, or at the rate of £1 4s. 4·72d. per 1000 cubic feet of gas sold; the price being 3s. 9d. within, and 5s. 7d. and 4s. 7d. beyond the borough. Ten years later, the capital expenditure was £70,774, or at the rate of 18s. 8·80d. per 1000 feet of gas sold at the uniform price of 3s. 4d. for lighting, and 2s. 11d. for stoves and motive power. Last year the total expenditure was £82,376, or at the rate of 15s. 0·57d. At the beginning of the financial year the prices were 3s. and 2s. 6d. per 1000 cubic feet; but last September they were brought down to 2s. 10d. and 2s. 4d.

GAS SUPPLY IN SHANGHAI.

We have just received from the Engineer of the Shanghai Gas Company (Mr. H. King Hiller) a copy of the report of the Directors and the accounts of the Company for the year ended Dec. 31, 1898, which were presented at the annual general meeting on the 23rd of March. Notwithstanding the high prices paid for coal, the accounts show satisfactory results; the profit on the working being 53,934 taels, or about £7191. The gas sold to foreigners and for the public lamps produced 95,785 taels; and that supplied to natives, 75,281 taels. The sale of coke yielded 18,241 taels; and of tar, 6728 taels. The profit on the fitting account for the year (4931 taels) brought up the total revenue to 200,965 taels. The manufacture of gas cost 123,244 taels; distribution, 9363 taels; and management and general charges came to 14,424 taels—making a total of 147,031 taels, and leaving the balance above stated. The net profit for the year, after providing for interest on debentures and the reserve fund, was 44,466 taels, of which 7386 taels have been written off for depreciation of plant and buildings. The balance at the credit of the profit and loss account at the close of the year was 56,565 taels (£7542), out of which the final dividend, amounting to 18,000 taels (£2400), was paid in January. The private consumption of gas increased by 1,770,063 cubic feet, or 1·63 per cent. There was, however, a drop to the extent of 1,874,750 cubic feet in the quantity used for public lighting; making the gas sold in 1898 nearly the same as in 1897. The Engineer's report showed that 13,170 tons of coal and shale were carbonized last year; the gas produced being 129,264,500 cubic feet, or 9815 cubic feet per ton—the average illuminating power being 19 candles. The gas sold during the year and in the holders on Dec. 31 last was 117,116,400 cubic feet; used on the works, &c., 1,202,700 cubic feet; unaccounted for, 10,945,400 cubic feet, or about 8·47 per cent. There were 4822 yards, or 2¾ miles, of new and enlarged mains laid during the year. When presiding at the meeting at which these figures were submitted, the Chairman of the Company (Mr. E. Jenner Hogg) explained that, compared with the year 1897, the receipts for gas and residuals showed an increase of 15,285 taels, or 8·45 per cent.; while the expenditure increased by 18,200 taels, or 14·12 per cent., entirely due to the cost of coal, as other items generally evidenced economy. In foreign consumption, including public lamps, there was an increase of 9557 taels, or 11·08 per cent.; native consumption giving 4111 taels, or 5·77 per cent., more. Of residuals, coke brought in 1507 taels, or 9 per cent., more; and tar, 108 taels, or 1·64 per cent., more. On the other side of the accounts, coal, shale, and petroleum carbonized cost 19,432 taels, or 25·57 per cent., more than in 1897; purifying materials, 834 taels, or 44·75 per cent., less; salaries and wages, 1297 taels more; and general charges were 1548 taels more, due to larger outgoings for rentals, taxes, and fire insurance. Repairs and maintenance appertaining to manufacture showed a decrease since the recent large expenditure in putting the works in order. The outlay (including 5490 taels spent on renewals of retorts and settings) was less than last year by 2757 taels, or 15·83 per cent. Repairs and maintenance, appertaining to distribution, showed a decrease of 486 taels, or 9·20 per cent. Mr. Hogg, in the course of his remarks, referred to acetylene, to assure the proprietors that the Directors were alive to its possibilities. He acknowledged that it gave a beautiful light, but said its cost was too high to allow of its use by the Company for practical purposes; and, moreover, there were risks attaching to it which it would be well to see overcome before they took it up. The report was adopted. At the close of the general business a special meeting was held, at which the Directors were authorized to issue debentures to the amount of 300,000 taels.

MONTE VIDEO GAS COMPANY, LIMITED.

The Ordinary General Meeting of this Company was held last Friday at Winchester House, Old Broad Street, E.C.—Mr. A. K. Mackinnon in the chair.

The Secretary (Mr. A. G. Hounsham) read the notice convening the meeting; and the report and accounts, to which reference was made last week, were taken as read.

The Chairman said he hoped it had been an agreeable surprise to the shareholders to learn from the report that, in spite of the year's working having been carried on during a period officially described as "a year of exceptional agitation and unrest," the Directors were enabled to announce that the net profit for 1898 had increased by £1049 over that of the previous year, that the sale of gas had been only 1·17 per cent. less, that the number of meters in use had risen to the extent of 6·78 per cent., and the number of consumers had advanced by 11·75 per cent. The two last items he asked them to particularly note as being the largest increases of late years; and with a fair prospect—having at length obtained the blessings of peace and a stable Government—he thought they might reasonably expect an increase of revenue to make up for past deficiencies in this respect, and reap the benefit of the reductions in the price of gas by a corresponding increase in the consumption. Dealing with the balance-sheet, he said it would be noticed that the contingency account, which in 1897 figured at £25,273, stood in the present accounts at £18,299, while in next year's statement it would be reduced by £10,543. This was the amount which the Directors recommended should be taken from the contingency account in order to pay the dividend of 5 per cent. on this occasion. They thought this was the proper course to adopt, and was only fair to the shareholders. When the price of gas was reduced, it was anticipated that there would be a large addition to the number of consumers, and a great increase in the sales of gas—in other words, a broadening of the basis of the Company's business. But since the Directors took that step, revolutions and civil war had been the portion of Uruguay; and all their calculations and anticipations had been upset. So far as could be seen, however, the outlook now was brighter and more hopeful; and therefore the Directors considered it right that the shareholders should benefit by the contingency account meeting the loss caused by the circumstances he had mentioned. The reserve account, it would be seen, stood at £59,460. They had during the past three years reduced the debenture debt by £14,540; and the amount now owing on that account was £43,540. The insurance fund remained the same—£12,500; making, with the balance of the reserve account, a total of £71,960. On the credit side of the balance-sheet, the expenditure on capital account had been increased by £1595 for new and additional mains, services, and meters, which brought the total capital outlay up to £597,430. The stocks of coal, material, &c., showed an increase of £3154. The Government account due from previous administrations to June, 1890, remained at £5611, which the Directors were in hopes might be paid before long, as, by late advices, they heard that negotiations for the settlement of these outstandings were in progress. On the debtor side of the revenue account, there was a very satisfactory decrease in the cost of manufacture and other expenses at Monte Video. The items at the credit of profit and loss account amounted to £21,097, as against £20,346 in 1897, or an increase of £751, adding to which £298 decreased charges, they obtained the £1049 increased profit. The item of exchange was somewhat on the increase, owing to the loss on silver coinage, and now also on copper coinage. The bad and doubtful debts, he was happy to say, had been reduced very considerably. Off capital account, £1164 had been written; leaving a profit-balance of £16,552 available for the year's dividend. The Chairman proceeded to point out the grounds on which he based his reasonable expectation that the country would now make great progress in the development of prosperity, and then referred to the Company's prospects. So far, he said, they had only secured the custom of a small part of the inhabitants of the capital, who now numbered about 260,000. The Directors some time since issued a pamphlet, and were about to issue another, which he believed would aid them in obtaining a substantial increase in the consumption of gas for heating purposes. The prepayment-meter system, too, was making steady progress; and the works were in a thoroughly satisfactory condition. Their latest advices justified the hopes which the Directors held out in their report of improved business during the current year. By a telegram received the previous day, they learnt that for the four months ending April last, the sales of gas increased over the corresponding four months of 1898 by nearly 2 per cent., and that the meters in use had increased by over 8½ per cent.; while thus far in May they had added 38 to the number of meters. These figures were full of promise for the future development of their business. Coincident with the last reduction in price, they made special efforts to popularize the use of gas; but unfortunately political events quickly upset all estimates and hindered all development in Monte Video. Now he believed the tide had turned. Peace and quietness were factors that had never yet failed to help the Company's operations; and from the moment they were assured to the country, the result of the Directors' efforts had begun to show itself in the satisfactory increases he had referred to. He concluded by moving the adoption of the report and accounts.

Mr. M. T. Hood seconded the motion.

Dr. Mulvany said it did not require much perspicacity to predict whither the policy of the Directors was driving the Company; and it must be brought home to the shareholders by the present report that unless there was a material change in the Directors or their policy, the shareholders would soon be without a dividend at all. With the view of showing how the Company were drifting, he pointed out that in 1897, there was £31,552 available for dividend, in 1898 (after the reduction in the price of gas) £19,959, and this year £16,552; so that in three years there had been a fall of £15,000. Compared with eleven years ago (1887), the profits showed a reduction of £21,000. In 1887, the receipts from gas, &c., amounted to £101,580; while last year they were £40,000 less. In 1887, they had a substantial reserve and no debentures. Last year nothing was added to the reserve; but they redeemed £14,540 of debentures. This year they only paid off the insignificant sum of £4600, but added nothing to reserve, and almost wiped out the contingency fund, which in 1896 stood at £26,358. To pay the miserable

dividend of 5 per cent., the Directors had to take £10,543 from it—reducing it to such a small sum that, unless the profits were much better in the ensuing year, no dividend would be forthcoming. On the appearance of the report, the shares promptly fell 10s.; and he should be surprised if they did not see a further fall in them. At present they were at about 22½ per cent. discount. He failed to see why the price of the gas should be continued at a figure wholly unremunerative. Two years ago a reduction in the price of 12 per cent. was made; and this struck the Company so heavily that it would never recover, unless a new line of policy was instituted for its rehabilitation. Then there was an item of £5611 under Government account, which appeared year after year, but it did not seem that any great efforts were made to recover it. He hoped that the Board would lose no time in increasing the price of the gas, and otherwise endeavour to improve the condition of the Company.

Mr. Low was of opinion that there was a want of energy or initiation in connection with the Company—anyway there was something decidedly wrong; but what it was he did not know. Three years ago, one of their Directors (Mr. Robert Morton) told them he regretted that the price of gas was not reduced several years before. Where the Company would have been now, if this had been done, he did not care to contemplate. The uses to which the funds of the Company were being put were, it seemed to him, grossly irregular. The contingency fund was intended to meet untoward accidents; but it was being employed to pay the dividend. The reserve fund, which ought to be sacredly held for the purpose of equalizing the dividends, was now being applied to the paying off of the debentures. It might be said that they had the electric light against them. To that he should say "rubbish;" for he knew of several towns where the electric light had been established, and it had not injured the gas company in the least. He thought a Committee ought to be appointed to look into the affairs of the Company.

Mr. A. H. Barber, referring to the £5611 due from the Government, said the debt, having been owing since 1890, should certainly be valued at something like half its nominal figure. He also asked the Chairman where, if he required another £10,543 to make up the dividend at the close of this year, he was going to get it from. They would not have it in the contingency fund; and so, he supposed, the shareholders would not get even 5 per cent. dividend. He also desired information as to how the Government were getting on with their electric lighting; and what the Directors were doing in regard to the power which the shareholders confidingly gave them to take up electric lighting. He believed the Directors had done what they could, in a quiet way, to push the sale of gas.

Mr. Hughes asked for information as to the item "loan from bankers £8000."

The Chairman, replying to some remarks directed to him personally, said he was an Engineer of fifty years' standing, and was the first Engineer of the Company. He had stuck to it through thick and thin, and had never spared himself in endeavouring to further its interests. He agreed that it would be suicidal to further lower the price of gas; but the Board had no intention of raising it—their policy being to work up the consumption; and they were applying themselves to this most energetically. With reference to the Government debt, he had no doubt that it would be paid. This was not the only amount owing by the Government; and he explained that, when a new Government came into power, the debts of the old Government had to be specially provided for by the Chambers. When he (the Chairman) went out to Monte Video in 1887, the Government owed the Company £18,000 and 250,000$; and he arranged this with the Government, and obtained the whole of it for the Company. These amounts were equivalent to £50,000; and when he got the money over here, he urged that it should be kept as a reserve fund. The shareholders agreed to this, although some of them wanted to distribute it. The contingency fund was intended to aid the reserve fund in equalizing the dividends; and so, feeling that their prospects were now brighter, the Directors had had recourse to it. With regard to the powers which the shareholders gave the Board in connection with electric lighting, they had not seen their way to incur the large expense which would be required to carry out a scheme. They were in hopes that the Municipality might have asked them to take over their installation, which would have been a good thing both for them and the Company. As to where the next dividend was coming from, they had still a portion of the contingency fund left; and the Directors calculated that the improved revenue would recover the deficiency. The whole of the loan from the bankers had been paid off.

Dr. Mulvany proposed an amendment to the effect that the accounts be received but not adopted, and a Committee be appointed to investigate and report upon the affairs and management of the Company.

There was no seconder; and on the motion for the adoption of the report being put, it was carried with one dissentient (Dr. Mulvany).

The Chairman next moved the declaration of a dividend of 10s. per share, making, with the interim payment, 5 per cent. for the year.

Mr. T. C. Tatham, in seconding, remarked that it would be foolish to depart from the policy of cheapening the price of gas whenever possible. It was unfortunate for them that, when the price was last reduced, a revolution came, which prevented the Company reaping the benefits which the Directors had expected. It was owing to this that they had now to appeal to the contingency fund to pay the 5 per cent. dividend. The price of gas was still dear—it was at present equal to about 14s. per 1000 cubic feet.

Mr. Robert Morton wished to add to his colleague's remarks that the best stroke of work the Directors ever did was to reduce the price of gas. They had gained 130 additional consumers this year; while, if the price had not been reduced, they might, with the strong competition of the electric light, have had 150 less. Apparently, from the way some of the shareholders had spoken, they had little idea of the irksome work the Board and their officials had to perform. If the price had been reduced before the introduction of the electric light, he felt confident they would have held their own very much better than they had done.

Mr. Hood also pointed out that the electric light undertaking was the property of the Government; and therefore they obtained their coal and material free of all charges, while the Gas Company had to pay the full amount. This made the competition much more serious for them.

The motion was agreed to.

Mr. Simpson Rostron and Mr. Hood, the retiring Directors, having been returned to their seats at the Board, the former gentleman said he wished it distinctly understood that the shareholders were re-electing him as an advocate of cheap gas.

Messrs. Price, Waterhouse, and Co. and Mr. Edward Cheshire were the retiring Auditors. The former were re-appointed; but, on account of age and ill-health, Mr. Cheshire did not again offer himself. In his stead, Mr. A. H. Barber was unanimously appointed.

The usual complimentary votes concluded the proceedings.

THE GAS-RATE WAR IN NEW YORK.

Our American Contemporaries' Views on the Question.

In the "Journal" for the 9th inst. (p. 1238), we reproduced a paragraph dealing with the above subject from a correspondent of the "Glasgow Herald." It was there stated that all the Companies supplying Greater New York with gas were engaged in an embittered war of rates, which, while perfectly agreeable to the citizens, was causing alarm to the shareholders. On the day of writing (the 3rd inst.), the charge for gas had, it was said, been brought down to 50c. per 1000 cubic feet; and further reductions were regarded as certain. The following comments on the situation are taken from the "American Gaslight Journal" for the 8th inst.

It is rather queer to know that corporations will expend considerable sums of money to prevent Legislatures from interfering with their businesses in certain ways; but it is queerer still to see the same corporations, on the immediate adjournment of a Legislature, take steps against themselves very much in advance of anything proposed by the lawmakers. Such, however, is the current picture in the gas affairs of the Manhattan section of New York City. The "expired" Legislature of New York had many gas measures before it, most of which had to do with the price that might be charged; and in the list the rate was variously named at 90c. per 1000 feet as a maximum, and 75c. as the minimum. For New York Borough even a municipal gas-works was proposed. The suggested measures all failed, from one cause or another, of passage. The Legislature adjourned on the 28th of April. On the 1st of May, the gentlemen in charge of the Consolidated Gas Company said to their customers that, "until further notice," the selling rate would be 65c. per 1000 cubic feet. At about the same time, and not far from the same place, the proprietors of the New York Mutual Gaslight Company sang, "Me, too." The New Amsterdammers followed their lead with a 50c. per 1000 trump; and the Sage man of the Standard Company later on remarked that his Company's consumers need not transfer their allegiance to others because of any variance in the rates—no banners flaring the cut from the legal rate were flaunted by Mr. Sage's Company. And such is the situation in the gas business in New York Borough to-day. Regrettable it is beyond a doubt, for the contention is suicidal; and the responsible parties behind the New Amsterdam Company, be they gas men, electricians, or hybrids, are those who will pay for it all in the long run. The affair in its present illumination causes one to think of the time when the struggle for the control of the gas situation in Brooklyn was on; and those who remember the termination thereof know that value won there in the long run. The contest here to-day looks like a fair exemplification of *paritur pax bello*. But, as a rule, the peace that is produced by war usually ends to the cost of the weaker of the combatants; and our electric friends should remember that the race is not always to the swift.

Apart from generalization, however, the present miserable contest is to be deprecated, especially on the broad ground that financiers' estimates of what it costs to make and sell gas are now accepted as gospel by the ordinary investor. It is not so long ago that the engineer said to his capitalist employer: "I can earn so much money on such an amount of capital at such a price for gas." Now the capitalist says: "I have issued so much stock, and it is your duty to earn such a return upon it." Talk about burning the candle at both ends, or of eating your cake and having it! Either would be easy in comparison with the task laid upon the engineer by his banking salary master. Extraneous much of the above may seem to the reader, so far as it all applies to the "cuts" in gas-rates in this section since May's opening; but the logic of some of it is that the New Amsterdam and others of the marauding gas and electric concerns, with much franchise right and less property, should remember their instability. All round, though, the war is to be deprecated. But whether the battle is a real issue or a sham, the fact, in our belief, remains that the ones who will dictate its settlement are those who will control the Consolidated and the Mutual Companies. Some wails are heard from out-of-town districts as to the harm that is being caused to the industry in general by the 50c. New York rate. But as the wailings largely come from territories where like things have been done in the past, they may fairly be disregarded. In fact, take it all in all, New York has had a pretty good record, so far as maintaining gas-rates is concerned.

The following remarks on the subject appear in the current number of "Progressive Age."

To close observers who have followed the development of conditions in the New York gas situation, the recent announcement by the Consolidated and Mutual Companies that on and after May 1, "until further notice," a rate of 65c. would be made for gas, was a matter which caused little surprise. The trouble among the Companies operating in this city is no new thing. For a considerable period, and until within a year, "an harmonious working arrangement" has been in force. Last Fall, one of the Companies, without warning to the others in the compact, announced their intention, so that the statement got into the public prints, that they were ready to do business wherever they could find patronage. Meanwhile, at least two of the Companies were industriously at work making yearly contracts at 90c., 85c., and some contracts are reported to have been made at the low price of 70c. per 1000 feet. No effort was apparently too great to induce consumers to leave one Company for another. Stores and factories were equipped with Welsbach lights without charge to the patrons who would "change over;" and cash bonuses equal to the amount of a month's gas bill, we are told, have been given to some patrons. Those who

have received this liberal treatment claim that $250 to $300 "rebate" to "change over" has been by no means an uncommon occurrence. We refer to these matters for the purpose of showing that the situation had become unbearable, and called for radical treatment in order to preserve the business and interests of the stockholder. Recognizing the gravity of the situation, the Managers of the Consolidated Company did not hesitate to take the initiative and declare open warfare, to continue until those whom it claims are responsible for the present state of affairs should reach a frame of mind and a condition of purse to listen to reason. As was to be expected, the New Amsterdam Company immediately followed the Consolidated and Mutual Companies' cut, and announced a 50c. rate; while, as usual, Mr. Sage, who controls the Standard Company, is on the fence, ready, it is believed, to drop in the direction of the most money for Mr. Sage.

The whole affair is an unpleasant one for everybody; but there is satisfaction in the thought that it cannot be prolonged indefinitely. The influence of the New York "gas war" on the affairs of gas companies throughout the country is most unwholesome. At the moment there are an uncommonly large number of companies having trouble over franchises and rates with local authorities, while opposition schemes are more active and are being pushed with greater vigour than has ever before been witnessed. The 50c. gas-rate in New York has been taken up by the newspapers of the country generally, and the cry for "cheap gas" is heard throughout the land—New York being referred to as a city enjoying 50c. gas; no consideration being given to the causes which resulted in making the rate, nor reference made to the fact that the "cut" price is in the nature of a club to whip disgruntled interests into line. The outcome of the New York gas troubles, with past experience for a guide, can only result in one thing—consolidation. But how soon the managers of the various interests will bring themselves to give and take is a problem which time alone can solve. The stakes which are being played for are enormous; and many minds must be brought together before the solution can even be approached. Taking the bonds and stocks at the prevailing market prices of the several Gas Companies now operating in this city, the aggregated investment represents approximately $125,000,000. It seems a perfectly safe prediction that within a reasonable time New York will "astonish the natives" with a Gas Corporation whose capital will be simply colossal.

Ipswich Corporation Water Supply.—The annual revenue account of the Ipswich Corporation Water Department shows that the balance carried forward amounts to £9182. The expenditure totalled to £5087; while the receipts reached £14,269, of which £14,005 was derived from the water-rental for the year. Dividends on the consolidated loans funds required £6615; and the contribution to the sinking fund £1484. The total liabilities of the water-works are £248,234, balanced by assets, in which there is £1139 at the credit of the suspense account. The accounts were submitted at a meeting of the Council last Wednesday, when Mr. White, in explaining the figures, said the report generally was of an extremely satisfactory character. The testimony of the analyst was that the quality of the town water was excellent, from all sources of supply; and this was a highly gratifying fact. The accounts were passed.

GAS v. ELECTRICITY FOR STREET LIGHTING.

A Condemnation of Electric Lighting at Worcester.

At a Meeting of the Watch Committee of the Worcester City Council on the 19th inst.—the Mayor (Mr. J. A. Steward) in the chair—the Town Clerk reported that he had received a reply from the Gas Company to the communication from the Committee with reference to the lighting of Friar Street. They had asked the Company to erect three lamps of 500-candle power each at a cost of £27; but the Company offered instead to put up six lamps of 200-candle power at a cost of £5 per lamp per annum. The Electricity Committee offered to erect three incandescent electric lamps at a cost of £27; the previous estimate being to put up three arc lamps at a cost of £75 per annum, which could be reduced to £66. A deputation from the Electricity Committee, consisting of Mr. A. H. Parker and Mr. A. A. Maund, waited upon the Watch Committee with reference to the matter. Mr. Parker said the deputation wished to induce the Committee to alter their decision to ask the Gas Company to place certain lamps in Friar Street, and to remove the lamps put there by the Electricity Committee. It was very unfortunate, he thought, that this should have occurred. He pointed out that the electricity mains were already laid with the object of supplying the light, and brackets had been provided; so that if they discontinued lighting the street by electricity, all the expenditure up to the present would be a dead loss. The Electricity Committee were of opinion that arc lamps were not required in the street; and they thought that if they were allowed to place there a new kind of lamp the street would be amply illuminated. It appeared, however, that they were not to be allowed to try experiments. He asked the Committee to defer the matter for a time, until they had had an opportunity of seeing the lamps which the Electricity Committee had placed in the street. He had seen them, and he could only say that the street was far better lighted than it had ever been before, and certainly far better than it required. They were willing to erect the lamps at a cost of £9 or £9 10s.—the same price as that quoted by the Gas Company originally; and upon this transaction they would not get any profit. Mr. Parker emphasized the fact that the electricity works were the property of the citizens, and that if they took away any revenue from them it would have to be made up in some way. It would be far better for them to have the street well lighted, and use their own material, than go to a competing Company and pay them money which would have to come from the pockets of the ratepayers. Alderman Millington remarked that it seemed to him that the only argument was that they should pay more to the Electricity Committee than to the Gas Company for the same article. Mr. Parker replied that the Committee asked the Company to supply three lamps of 500-candle power each at a cost of £9 10s. Alderman Caldicott pointed out that the Company offered six lamps at £5 each. Mr. Parker referred to the great difficulty of keeping the mantles of incandescent gas-lamps in proper order. Alderman Millington moved that the Electricity Committee be allowed the time they required to try the experiment. Mr. Parker was not correct in saying that the Committee had not been allowed to try experiments. They had been allowed three years. The electric light there had been a failure; and if it could not be improved, the only

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 1424.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.	Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.	£			p. c.	GAS COMPANIES.			£ s. d.
590,000	10	Apl. 13	10½	Alliance & Dublin 10 p. c.	21½—22½	..	4 13 4	150,000	5	Nov. 30	8	Oriental, Ltd. . . .	7½—8	+¼	5 0 0
100,000	10	,,	7½	Do. 7 p. c.	15½—16½	..	4 10 11	135,000	5	,,	8	Do. New, £4 10s. pd.	6½—7	+¼	5 14 3
800,000	100	Jan. 3	5	Australian 5 p. c. Deb. .	104—106	..	4 14 4	15,000	5	,,	8	Do. do. 1879, £1 pd.	1½—1⅝	..	4 11 5
200,000	5	May 12	6	Bombay, Ltd. . . .	6½—7*	..	4 5 9	60,000	5	Mar. 29	7	Ottoman, Ltd. . . .	5—5½	+¼	6 7 4
40,000	5	,,	6	Do. New, £4 paid .	4½—5*	..	4 16 0	500,000	100	Dec. 1	6	People's Gas of Chicago 2nd Mtg. Bonds.	102—106	..	5 13 2
880,000	Stk.	Feb. 24	12	Brentford Consolidated	275—280	..	4 5 9								
240,000	,,	,,	9	Do. New . . .	215—220	..	4 1 10	848,070	10	Apl. 27	7	River Plate Ord. . . .	11½—12	..	5 16 8
50,000	,,	,,	5	Do. 5 p. c. Pref. .	140—145	..	3 9 0	250,000	Stk.	Dec. 30	4	Do. 4 p. c. Deb. .	103—105	..	3 16 2
159,375	,,	Dec. 15	4	Do. 4 p. c. Deb. .	128—133	..	3 0 2	250,000	10	Mar. 29	10	San Paulo, Ltd. . . .	16½—17½	..	5 14 3
220,000	Stk.	Mar. 29	11½	Brighton & Hove Orig. .	265—270	..	4 5 2	135,000	Stk.	Mar. 29	10	Sheffield A.	237—240	..	4 3 4
226,320	,,	,,	8½	Do. A. Ord. Stk. .	194—197	..	4 6 4	209,053	,,	,,	10	Do. B.	237—240	..	4 3 4
973,500	Stk.	Feb. 24	5	Bristol, 5 p. c. max. .	125—130	..	3 16 11	447,427	,,	,,	10	Do. C.	237—240	..	4 3 4
420,000	20	Mar. 29	10	British	47—49	..	4 1 8	5,600,000	Stk.	Feb. 10	5⅓	South Metrop., 4 p. c. Ord.	139—142	..	3 15 1
50,000	10	Feb. 24	12	Bromley, Ord. 10 p. c. .	25—27	..	4 8 11	1,460,000	,,	Jan. 13	3	Do. 3 p. c. Deb. . .	101—103	..	2 18 3
75,000	10	,,	9	Do. 7 p. c. . . .	20—22	..	4 1 10	—	—	—	—	Tottenham and Edmonton A.	—	—	—
500,000	10	Apl. 27	6	Buenos Ayres (New) Ltd.	10½—11	−½	5 9 1	—	—	—	—	Edmonton B. .	—	—	—
220,000	Stk.	Dec. 30	4	Do. 4 p. c. Deb. .	103—105	..	3 16 2	182,380	10	Dec. 30	5	Tuscan, Ltd.	9—10	..	5 0 0
150,000	20	Mar. 10	8½	Cagliari, Ltd. . . .	28—29	..	5 13 10	149,900	10	Jan. 3	5	Do. 5 p. c. Deb. Red.	99—101	..	4 19 0
100,000	10	Sept. 23	7	Cape Town & Dis., Ltd.	13¾—14¼	..	4 16 7								
50,000	50	May 2	6	Do. 6 p. c. 1st Mort.	56—58	..	5 3 5					WATER COMPANIES.			
550,000	Stk.	Apl. 13	13½	Commercial Old Stock .	312—317	..	4 5 2								
200,750	,,	,,	10½	Do. New do. .	245—250	..	4 4 0	746,184	Stk.	Dec. 30	11	Chelsea, Ord.	318—323	..	3 8 1
200,750	,,	Dec. 15	4½	Do. 4½ p. c. Deb. .	145—150	..	3 0 0	150,000	,,	,,	5	Do. 5 p. c. Pref. .	168—173	..	2 17 10
800,000	Stk.	Dec. 15	10	Continental Union, Ltd.	210—215	+3	4 13 0	160,000	,,	,,	4½	Do. 4½ p. c. Pref. '75	150—155	..	2 18 1
200,000	,,	,,	7	Do. 7 p. c. Pref. .	188—198	..	3 12 6	175,785	,,	Mar. 29	4½	Do. 4½ p. c. Deb. .	155—160	..	2 16 3
51,600	Stk.	Feb. 24	14	Croydon A 10 p. c. . .	305—310	..	4 10 4	1,720,560	Stk.	Apl. 13	7	East London, Ord. . .	219—222	..	3 3 0
168,400	,,	,,	11	Do. B 7 p. c. . .	255—265	..	4 3 0	654,740	,,	Dec. 30	4½	Do. 4½ p. c. Deb. .	157—160	..	2 16 3
555,000	Stk.	Feb. 24	5½	Crystal Palace Ord. 5 p. c.	130—135	..	3 17 9	390,000	,,	,,	3	Do. 3 p. c. Deb. .	102—104	..	2 17 8
60,000	,,	,,	5	Do. 5 p. c. Pref. .	140—145	..	3 9 0	700,000	50	Dec. 15	7½	Grand Junction 10 p. c. max. .	113—116	..	3 4 7
486,090	10	Jan. 27	11	European, Ltd. . . .	23—24	..	4 11 8	310,000	Stk.	Mar. 29	4	Do. 4 p. c. Deb. .	135—140	..	2 17 2
354,060	10	,,	11	Do. £7 10s. paid .	17—18	..	4 11 9	708,000	Stk.	Feb. 10	14	Kent	360—365	..	3 16 9
14,993,075	Stk.	Feb. 10	4.9	Gas-light and Coke Ord. . .	113—115	..	4 5 3	160,000	,,	,,	7	Do. New, 7 p. c. max. .	210—215	..	3 5 1
2,500,000	,,	,,	3½		101—103	..	3 8 0	1,043,800	100	Dec. 30	10½	Lambeth, 10 p. c. max. .	300—305	..	3 8 10
3,799,735	,,	,,	4		128—130	..	3 1 7	406,200	100	,,	8	Do. 7½ p. c. max. .	230—235	..	3 8 1
3 843,975	,,	—	—		101—103	..	—	350,000	Stk.	Mar. 29	4	Do. 4 p. c. Deb. .	135—140	..	2 17 2
70,000	10	Nov. 11	8	Hongkong & China, Ltd.	14—15	..	5 6 8	500,000	100	Feb. 11	13¾	New River, New Shares	433—438	..	3 2 9
3,800,000	Stk.	May 13	10	Imperial Continental .	225—230	+1	4 7 0	1,000,000	Stk.	Jan. 27	4	Do. 4 p. c. Deb. .	137—142	..	2 16 8
473,600	Stk.	Feb. 10	8½	Do. 8½ p. c. Deb. Red.	102—105	..	3 6 8	902,300	Stk.	June 29	7½	South-ark and Ord. . . .	215—220	..	3 8 2
75,000	5	Nov. 30	6	Malta & Medn., Ltd. .	5—5½	..	5 9 1	126,500	100	,,	7½	South-ark 7½ p. c. max.,	197—202	..	3 14 3
560,000	100	Apl. 4	5	Met. of 5 p. c. Deb.	111—113	..	4 8 6	489,200	Stk.	,,	5	and 5 p. c. Pref.	168—171	..	2 18 6
250,000	100	,,	4½	Melbourne 4½ p. c. Deb.	110—112	..	4 0 4	1,019,585	,,	Apl. 13	4	Vauxhall 4 p. c. A Deb.	135—140	..	2 17 2
541,920	20	Nov. 11	5	Monte Video, Ltd. . .	14½—15½	−½	6 9 1	1,155,066	Stk.	Dec. 15	10	West Middlesex . . .	304—307	..	3 5 2
617,946	Stk.	Feb. 24	9½	Newc'tle & Gatesh'd Con.	228—233	..	3 19 5	200,000	,,	,,	4½	Do. 4½ p. c. Deb. .	157—160	..	2 16 3
264,855	Stk.	Dec. 30	8½	Do. 8½ p. c. Deb. .	107—110	..	3 3 8	200,000	,,	Mar. 10	8	Do. 8 p. c. Deb. .	101—104	..	2 17 8

* Ex div.

alternative was to go back to gas. They could not afford to pay the Electricity Committee more than the Gas Company. The speaker expressed the opinion that, for street lighting purposes, electricity had been a failure all over the city. Alderman Caldicott seconded the proposition, though he said he did not agree with Alderman Millington on many points. He asserted that Friar Street had always been better lighted by electricity than by gas; and he pointed out that it invariably happened that the more they extended the electric lighting of streets, the more complaints they received from the neighbourhoods lighted by gas. The Mayor said he could not find the light in Friar Street until it was pointed out to him where the lamps were. Mr. Maund thought it was unpatriotic of the Committee to try and cast a slur on one of their own Committees for the sake of an outside undertaking. If they, as a Corporation, cried "stinking fish" of their own wares, they could not expect other people to become customers. He said it was incumbent upon them to use their own light, and put the money into their own pockets rather than take it from the ratepayers to help to pay the dividend of a private concern. The Electricity Committee proposed to charge the Watch Committee only what the light cost; but even then they would be paying the money to themselves. Mr. Rushton pointed out that the Electricity Committee had been asked for more than two years to consider the matter; and he regarded the present lighting as a disgrace to them. He pointed out that the Electricity Committee desired to conduct experiments with the ratepayers' money, whereas the Gas Company speculated only with their own. Mr. Jeff rose to move an amendment to the effect that the Gas Company be authorized to erect the six lamps; but his proposition was so unfavourably received that he withdrew it. Mr. Jeff asserted that they were spending much more money in lighting the city by electricity than they did in lighting it by gas. [Alderman Millington: No doubt of it.] The Mayor said he wished to see the street well lighted; but he should never think of paying £75 to obtain that end if it could be done for £30. Alderman Millington's proposition was carried; and the matter will be brought forward at the next meeting of the Committee.

Incandescent Gas Lighting Suggested for Bolton.

Some time ago, the Gas Committee of the Bolton Corporation instructed Mr. William Smith, the Gas Engineer, and Mr. James Parker, the Lighting Superintendent, to visit Liverpool and Southport to see how street lighting is carried out there, and to prepare a report on the subject for presentation to the Council. This report was contained in the proceedings of the Gas Committee confirmed at the last meeting of the Town Council. The officials named reported that the Corporation of Liverpool find that they can light their streets well at a much less cost by incandescent gas-lamps than they can by electricity; and hence they are extending this mode of lighting over the whole town. Seeing that the annual cost of lighting streets by electricity in Liverpool is six times greater than that of gas, and bearing in mind the fact that the Lighting Committee of the Liverpool Corporation have decided to light the whole of the City with incandescent gas-lamps during the next four years, there can be no doubt, Messrs. Smith and Parker say, with respect to their opinion as to the most economical and satisfactory system. In the case of Bolton, it was suggested by the Electricity Committee to place the arc lamps 80 yards apart, and after mid-night only light every alternate lamp, making the distance 160 yards, as compared with 50 yards at Liverpool. On this point the reporters say: "In our opinion, this would not light the town in a satisfactory manner, nor nearly so well as it would be by single and double incandescent gas-lamps placed along the streets or roads (say) from 20 to 30 yards apart. To light the principal streets in Bolton as suggested by the Electricity Committee would cost annually £900, covering a distance of 4000 yards. If the lamps were to be placed 50 yards apart as at Liverpool, the annual cost would be £1440, with one-half of the lamps extinguished at mid-night. To light with incandescent lamps on both sides of the street or road, at 40 yards apart, each side would require 200 lamps—100 lamps with double incandescent burners and 100 with single. The total cost for these would be £566 5s. per annum, and the 200 lamps would be lighted the whole night through." Summing up, Messrs. Smith and Parker say they are of opinion that, to light the town properly, the incandescent gas-lamps should be placed 20 yards apart, and the electric lamps 50 yards apart. If they dealt with the lighting in this way, the cost would be as follows: Double incandescent gas-lamps, 20 yards apart, £320 2s. per mile; single ditto, 20 yards apart, £225 2s. 8d. per mile; arc lamps, 50 yards apart, and maintenance as at Liverpool, £750.

ELECTRIC LIGHTING NOTES.

Mr. W. A. Valon, the Gas and Water Engineer of the Ramsgate Corporation, is preparing a report for the Council in connection with the electric lighting of the borough.

With reference to the application of the Dublin Corporation for loans for electric lighting purposes, amounting to £20,000 and £7000, the Local Government Board have sanctioned a total of £24,000.

The annual report of the Sunderland Corporation Electric Light Department shows that, after paying interest and sinking fund, there is a profit for the year of £364. The number of units sold was 472,240—an increase of 75 per cent. The average price obtained for current supplied to private consumers was 3·78d. per unit.

Doubtless stimulated by a recent application of a limited Company to supply Elland with electric light, the Electric Lighting Committee of the District Council have decided upon a definite course of action. They have passed a resolution advising that the necessary steps be taken to secure a Provisional Order for lighting the town with electricity; and at an early meeting of the Council, the question will come up for final settlement.

Colonel W. R. Slacke recently sat at the Town Hall, Croydon, to inquire on behalf of the Local Government Board into the application of the Corporation for power to borrow £20,000 for electric light extension. The Town Clerk informed the Inspector that the electric light undertaking had only been in the hands of the Corporation a year, and had been unable

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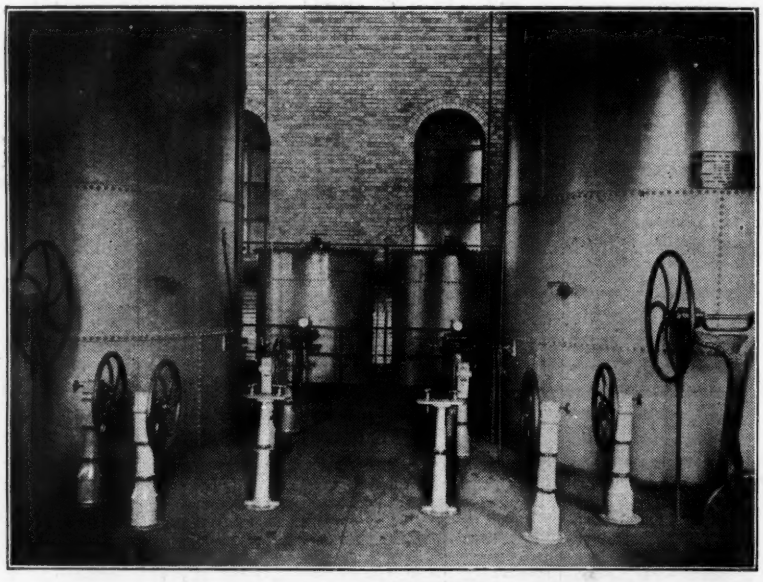

RESULTS PROVE EFFICIENCY.

Working Floor of Generator House. One Quarter Section of Birmingham Plant, Windsor Street Station.
The Maximum Daily Capacity of the Birmingham Corporation's Plant, which was erected by this Company, is 10 MILLION CUBIC FEET.

to overtake the demand. The Borough Electrical Engineer said that the number of private lamps had increased up to March from 17,412 to 31,220. The £20,000 applied for was required chiefly for the extension of the installation at South Norwood.

The Leeds Corporation, with the view of developing their newly-acquired electric lighting concern, think it well to tempt intending customers. They are going to supply current free of charge during June, July, and August to all who become consumers within that period. It is hoped by this means to induce those who contemplate taking the new illuminant to have their premises wired and connected with the mains during the summer months, when the work can be done more conveniently than later in the year. Only one condition is imposed, and that is that the current shall be used with reasonable care.

The annual report on the Sunderland municipal electric lighting works has just been issued. It shows that, after paying interest and sinking fund, there is a profit for the year of upwards of £364; this being the first year in which a net profit has been recorded. The total profit was £2855, or 4·8 per cent. on the capital outlay. The average price the customers of the Corporation have had to pay for their supply has been 3·78d. per unit. It is estimated that there are some 26,000 lamps lighted from the Corporation mains, with motors to the extent of 400-horse power. The number of units sold has risen from 270,209 to 472,240—an increase of 75 per cent.

The results of the fourth complete year's working of the Bolton Corporation Electricity Department have been placed before the Council. During the twelvemonth, the output was largely increased; and the net profit advanced from £917 to £1205. This has enabled the Committee to hand over £1000 in aid of the rates; but the Council are asked not to expect too much in the near future, seeing that an additional £70,000 is being spent on the works during the current year. While sincerely congratulating the Committee on their success, Alderman Miles, the Chairman of the Gas Committee, disclosed the fact that, of the profit mentioned, £736 was produced by the electric fittings branch of the business. He also warned the Committee to be careful in regard to the expenditure of capital.

The Huddersfield Town Council have lately adopted a recommendation of the Electric Lighting Committee that a reduction be made in the charge for current from 6d. to 4½d. per unit, with discounts of from 1 per cent. on 1000 units consumption up to 15 per cent. on 6500 units. The reduction will take effect from July 1 next. It was stated by Alderman Calvert that at the present time there were 875 users of electricity in the borough, of whom only 280 had received discounts. The remaining 595, apart from the 5 per cent. discount for cash, had received no consideration hitherto. The reduction proposed would be equal to 25 per cent., and would benefit 75 per cent. of the users. It was believed that the reduction would have the effect of increasing the number of consumers without any further capital expenditure.

The Salford Corporation having applied to the Local Government Board for permission to borrow additional money for electric lighting purposes, Colonel C. H. Luard, one of the Board's Inspectors, has held an inquiry into the matter. Mr. L. Caradoc Evans, acting Town Clerk, stated that it was proposed to build an electricity generating station at Pendleton, at a cost of £5822. Mr. A. Haworth, Chairman of the Electric Lighting Committee, mentioned that applications had been received for twice the amount of power they could at present produce. The first generating station was built three years ago; and the loss on the undertaking in the first year was £3975, including the sinking fund. In the following year the amount was £2900; and in the third year, up to last March, £855. There was a little opposition; but the Inspector's opinion was that there was every appearance of a probable profit when the new station was provided.

A private meeting of the Leamington Town Council has been held for the purpose of considering the special changes which the Board of Trade proposed should be made in the Electric Lighting Provisional Order for the borough. At the close of the sitting *in camera*, the Mayor (Mr. Gordon Bland) moved that the Council accept the Order as amended by the Board of Trade, and that the Electric Light Committee be instructed to forthwith enter into negotiations with the Company with a view to acquiring the undertaking. His Worship added that the chief difference in the position was that they had twelve months to think the matter over before deciding whether they should buy by private treaty or go to arbitration. The resolution was carried. The Mayor stated that, acting on legal advice, he had ruled that any shareholder in the Gas or Electric Light Companies was not entitled either to speak or vote on the question. A written protest against this ruling had been handed to him by Alderman Thursfield, who reserved the right to test the legality of the ruling, or of any decision the Council might come to in the absence of his vote.

At a meeting of the Hull Corporation Electric Lighting Committee on Thursday, the Chairman (Mr. Skinner) reviewed the work of last year—the sixth of the Committee's operations. He said it was gratifying to him to be able to state that the results of the undertaking during the period under review were in every way satisfactory. They commenced the year with 678 consumers, taking 467,352 units in twelve months, and at its close these figures had increased to 960 consumers and 749,690 units. The cost of production had been reduced by a little over ¼d. per unit; being 2·51d., against 2·78d. The total income was £16,333; the expenditure, £12,673—the balance of profit being £3660. This amount would be carried to the reserve fund, which would then amount to £8168. Looking at the matter all round, it appeared desirable that some reduction in the charges should be made; and he had pleasure in submitting for the Committee's approval a proposal for a reduction, as and from the 31st of March last, of ½d. per unit on all current sold for lighting purposes only. This would, on the basis of last year's working, involve a drop of about £1500 in the profits. The charges would stand as follows: Ordinary consumers for light, 5d. per unit; ditto for other purposes, 2½d. per unit; large customers having more than 100 lamps fitted up and charged on the Brighton system, 5½d. per unit the first hour and 2½d. afterwards.

The Eccleshill and Bolton Gas Company have placed with Messrs. R. Dempster and Sons, Limited, of Elland, the order for a new rotary exhauster combined with steam-engine on one bed-plate.

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SOUTHAMPTON CORPORATION AND LOCAL WATER BILLS.

The Corporation and the South Hants Water Company.

At the Meeting of the Southampton Borough Council last Wednesday, the Parliamentary Committee submitted a report of the Special Sub-Committee appointed to watch the Corporation Water Bill and the Bill of the South Hants Water Company now in Parliament. It stated that the former Bill was before the Select Committee of the House of Lords on the 19th, 20th, and 21st of April; and, having heard Counsel and witnesses for and against it, the Committee decided that it should proceed. As the clauses were unopposed, the preamble and clauses, as amended, were read and agreed to. Great stress was laid by Counsel, in opposing the Bill upon its merits, on the alterations and additions which had been made subsequently to its introduction; and the Sub-Committee considered it necessary to report fully upon these amendments. Clause 6 (the purchase clause), as originally drafted, was as follows:—

The Corporation may, within six months after the passing of this Act, by notice in writing, under their common seal, addressed and sent to the Secretary of the Company, or delivered at the principal office of the Company, require the Company to sell, and the Company shall thereupon sell, to the Corporation the borough undertaking of the Company, for such consideration as the Company and the Corporation may agree, or, in default of agreement as shall be settled by arbitration, in the manner provided by the Lands Clauses Acts.

In his observations upon the Bill, Lord Morley altered the word "may" into "shall." Thereupon Mr. Coates (of Messrs. Dyson and Co.), the Water Engineer (Mr. W. Matthews), and the Deputy Town Clerk attended before his Lordship on the subject of his observations generally; and Mr. Coates used every endeavour to induce him to allow the clause to stand as originally drawn, but without avail—Lord Morley pointing out that if it was sought to put compulsion upon the Company to sell, it was only fair that compulsion should also be put upon the Corporation to buy. While the Bill was under the consideration of the Lords Committee, Mr. Coates had a further interview with Lord Morley; and he ultimately succeeded in getting his Lordship to accept the following clause, which now stood as part of the Bill:—

If the Corporation, within six months after the passing of this Act, by notice in writing, under their common seal, addressed and sent to the Secretary of the Company, or delivered at the principal office of the Company, require the Company to sell the borough undertaking of the Company, the Corporation may and shall forthwith purchase, and the Company shall sell the same to the Corporation, for such consideration, being a sum in gross, as the Company and the Corporation may agree, or, in default of agreement, as settled by arbitration, in the manner provided by the Lands Clauses Acts.

With regard to the provision for the application of revenue, at a conference which took place prior to the consideration of the Bill by the Committee, Counsel urged the insertion of a clause showing the intention of the Corporation to effect a reduction of the water charges in the added areas; and the Sub-Committee subsequently approved and authorized the insertion of the following sub-section:—

If, after making the payments aforesaid, there shall be any surplus of the water revenue, the Corporation, until the charges for a supply of water are equalized throughout the borough, shall, for the purposes of effecting such equalization, make such a rateable reduction in the charges for a supply of water in the area added to the borough as shall be proper, having regard to the payments to be made out of the water revenue under the foregoing provisions of this section.

The Sub-Committee asked the Parliamentary Committee to recommend the Corporation to approve and confirm the Bill as amended before the Select Committee of the House of Lords and introduced into the House of Commons. As to the South Hants Water Bill, they reported that, in consequence of the success which attended the Corporation Bill, and the acceptance by the South Hants Water Company of a clause restraining both the Corporation and the Company from constructing new works within a radius of two miles from the existing works of either party, the opposition of the Corporation to the Company's Bill had been withdrawn so far as regarded the House of Lords only. The Sub-Committee further reported that the Bill of the Corporation had been read a first time in the House of Commons, and they recommended that it should be proceeded with, and that a petition be presented against the South Hants Water Bill in that House. The Parliamentary Committee resolved unanimously that the foregoing report should be adopted; and they accordingly recommended the Council to approve and confirm the Corporation Bill as amended, and to proceed with it in the House of Commons, and to petition against the Bill of the South Hants Water Company in the same House; also that the attention of the Company be drawn to the letter sent to them by the late Town Clerk on the 30th of January last, suggesting a conference between the Committee and the Directors of the Company, with the view of an amicable arrangement being arrived at with respect to the above-named Bills, and that they be informed that the Committee were still prepared to meet the Directors.

The Mayor (Mr. Hussey) proposed the adoption of the report, and deprecated any discussion upon it, as the Bill would have to go before the House of Commons later on. Alderman Le Feuvre acknowledged the general correction of the report, but brought forward a charge against the Sub-Committee of having suppressed certain information in connection with the verbal alteration made in the purchase clause by Lord Morley. Alderman Turner was understood to say that the report of the Sub-Committee was submitted to the Parliamentary Committee. The Mayor denied that there had been any suppression. He said the question of the Lord Chairman's alteration came before the whole of the Parliamentary Committee, and it had been borne out by Alderman Turner. He called upon Alderman Le Feuvre to withdraw the word "suppressed," and threatened to leave the chair if this were not done. Alderman Candy said he was not a member of the Sub-Committee, and took no interest in the matter personally; but he heard the report, and there was not the slightest suggestion that any portion should be suppressed. Alderman Bance thought that, after the explanations given by Aldermen Turner and Candy, the offensive word should be withdrawn. Alderman Le Feuvre continued to hold to his point; whereupon the Mayor left the chair amid the hearty applause of the members of the Corporation who had remained in the chamber.

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NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

There is to be no strike of gas workers in Glasgow. Mr. Pete Curran (who, by the way, is said to be a native of Glasgow) has been on a visit to the city; and during his stay the subject has been settled. People do not like to pay away money till it is asked for, and the Gas Committee would scarcely have been in order to have raised the wages of the men, as they are doing, unless they had been applied to. But, all the same, it is a pity that Mr. Curran should be able to go elsewhere and say: "Join our Union. See what I did for the gas men in Glasgow." The men's demands were a week's holiday with pay, 6d. per day advance, the abolition of signing-on for a definite period, time-and-half for Sunday labour, employment preferentially of ratepayers, and equality of work and wages in the three stations. What has been granted by the Gas Committee is an advance of 3d. per day, and five days' holidays in the year. The concession of the men's demands would have meant an increased outlay of over £10,000 a year. The Committee have therefore been able to arrange matters so that the increase will probably not be more than £5000; and Mr. Foulis can meet this without inconveniencing the department. What took place this week was that the workers met on Sunday, in the Albion Halls, where Mr. Pete Curran addressed them. He said that the concessions asked by the men were reasonable, and the wages and holidays which they wanted would only raise them to the standard which prevailed in large centres in England. The total membership of the National Union of Gas Workers (and General Labourers, I think) was 44,422; and during the past quarter the Union disbursed in strike pay £3288, and recovered for members £568 as compensation for accidents and wages. Notices of dismissal to eighteen men at the Dalmarnock works had been withdrawn; and the Gas Committee had stated that there would be no victimizing. Then the Gas Committee met on Tuesday and agreed to the concessions I have mentioned. On the evening of the same day, the workers again met in the Albion Halls; and Mr. Curran said that, while they had been offered an instalment of their demands, and while he hoped they were prepared to accept them, the case could not by any means rest there. The signing-on for a given period was obnoxious, and was contrary to the principle of what was known in the Trade Union world as collective bargaining. Meantime, he asked the men to take what they had been offered, but to proceed with their agitation to have signing-on abolished. The men adopted a resolution accepting the concessions granted, but expressing regret at the action of the Gas Committee in failing to concede the total abolition of the present system of signing-on, pledging themselves to continue the agitation till it be absolutely abolished, and adhering to their demand for time-and-half on Sundays. I daresay the agitation will fizzle out now, for the Corporation are not likely to give up the practice of signing-on, whatever they may be prepared to do in the matter of Sunday labour, as to which the new gasholder at Temple and the new works at Provan will enable them by-and-bye to be more independent than they are at present. The willingness to accept the half loaf offered to the men seems to point to Mr. Curran not having obtained a large following. Had he felt himself able, he would doubtless have stood out for the whole. In this connection, the wisdom of the men is apparent, and gives ground for the anticipation that there will be no more trouble.

Technical education is a matter upon which we hear a good deal in the present day. Unfortunately, the subject is handled mostly by those who do not require to apply themselves to the acquisition of it. The demand is not from those who wish to be taught; the provision of such education is a stern necessity, arising out of the keen competition we now encounter in commerce. Masters see that it is requisite that workmen should be more highly skilled than they have been, but men are not so much aware of the altered circumstances; and thus it is to be found that the provision for imparting technical instruction is frequently much greater than the advantage which is taken of it. A good instance of this is to be found in the Heriot-Watt College in Edinburgh. The institution is liberally furnished with means, and is prepared to provide instruction in any handicraft for a merely nominal fee. Yet only a few occupations are taught there. One of the subjects which have been taken up is that of "Gas Manufacture and Appliances," in connection with which a class has been conducted during the last three years by Mr. Henry O'Connor, of Messrs. Milne and Son, Limited. As the outcome of the past session, ten of the pupils are entering for the City and Guilds of London examinations. Some of the students take the instruction, but do not go up to be examined. Surely this is a meagre attendance in a city where there are hundreds engaged in gas manufacture, and many more are employed in producing and in handling gas appliances. There is nothing of the nature of compulsion in the matter of technical education as yet; and probably there may never be statutory enactment to that effect. But it may be looked for as certain that the employers will, more and more, promote those workmen who have been to the technical school; and thus men who desire to rise in the world will stand very much in their own light if they do not see to it that they acquire a knowledge of their handicraft more thorough than can be given by the average apprentice-master. Such knowledge can only be obtained by attending schools and colleges where the teaching is by men like Mr. O'Connor, who know their subject through and through; and where the charges are next to nothing at all, it is a pity to see the teaching not appreciated by the great bulk of the men for whom it is intended.

A litigation has been entered upon in the Court of Session, in which Mr. J. Christie, ex-Councillor, of Forfar, sues Mr. R. F. Craik, one of the councillors of the burgh, for £1000 as damages for alleged slander. The statements which are complained of relate to transactions in hay and straw; but the two men have often been mentioned in this column, their stiffest controversies for years having been over the conduct of the Corporation gas undertaking. Mr. Craik was for many years the Convener of the Gas Committee, and Mr. Christie was his severest critic. The pursuer avers a long course of bitter hostility towards him; and when the trial comes on, I presume it will be impossible to exclude references to gas affairs.

It may be expected that the rise in the price of coal this year will lead,

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in not a few instances, to an increase in the charge for gas. The first intimation of the kind I have seen is from Motherwell, where it is proposed to raise the price, as from the 1st prox., from 2s. 11d. to 3s. 4d. per 1000 cubic feet.

The Gas and Electric Light Committee of the Aberdeen Town Council this week settled their coal and lime contracts. Coal has been secured, to produce gas of 24-candle power, at an average price of 17s. 9½d. per ton, or 2s. more than is being paid under last year's contracts. The quantity required is about 51,000 tons. A large proportion of the coal used in the Aberdeen Gas-Works is carried by sea. The tenders for this work were considered not quite satisfactory; and a Committee have been appointed to consider as to the chartering of a steamer. The lime contract consists of 1200 tons, which have been purchased at the price of 17s. 3d. per ton.

If the experience of Cowdenbeath be of any value, it may be concluded that coal gas is able to hold the field as against all its rivals in the line. Last year, it will be remembered, the Gas Company substituted acetylene for coal gas; but the change was not appreciated by the public when they found that the charge for the new gas was at the rate of £5 per 1000 cubic feet. It has been found impossible to collect this sum from some consumers; and the Directors of the Company, out of deference to widespread opposition, turned to oil gas, which has been supplied for some months. It, again, is not regarded as altogether satisfactory; and the Directors are considering the propriety of a return to coal gas. They have obtained a report on the subject from Mr. Hubert Pooley, Gas Engineer to the Corporation of Dunfermline, which they will have before them at a meeting to be held early in June. Meantime, a movement is on foot for the formation of a new coal-gas company to supply the town; but the expectation is that it will result, not in opposition, which would be making matters worse instead of better, but in the strengthening of the existing Company. The proposal is to issue new shares of £10 each. The gas consumption has hitherto been mostly confined to the shop-keeping class; and a good many of them have signified their willingness to take shares. Whatever be the result of the negotiations, it is intended to make an endeavour to extend the use of gas in private residences. A public meeting to discuss the subject is spoken of; but the Directors of the Gas Company are to be allowed to first say what they propose.

The town and district of Falkirk are growing at a greater rate than any other similarly situated district in Scotland. The question of erecting new gas-works is under consideration, and so is that of the augmentation of the water supply. It was only in 1886 that the existing water-works were designed for bringing in water from the higher tributaries of the River Carron. At that time the population to be supplied was about 30,000, while it is now 40,000. The works were designed to supply 2 million gallons of water per day. This quantity is now practically being taken; and the Water Trust are under the necessity of looking out for more water. They hold powers, under a Bill which they obtained two years ago, for the heightening of the embankment of the Faughlin Burn reservoir by 20 feet; but in the opinion of some this would be a dangerous step to take. The proposal now is (as recommended by Mr. J. M. Gale, of Glasgow) to take in 1000 acres of additional gathering ground in the same district; to intercept the water from this area by a culvert or catchment drain; to convey it into the valley of the Little Denny Burn; and there to construct a new reservoir, of 116 million gallons capacity, at a higher level than the existing Little Denny reservoir. The cost, exclusive of land, is estimated at £43,500. By this scheme, the supply would be raised to 3 million gallons per day. Mr. Gale points out that the consumption of water is 50 gallons per head per day; and he suggests that it ought to be greatly reduced. The Water Trust discussed the proposals of Mr. Gale last week, and resolved, with only four dissentients, to proceed with a Bill in Parliament for carrying through the scheme recommended by him. The work is expected to take about ten years to complete. In the view of the dissentients, Mr. Gale's scheme implies the throwing away of public money, as the embankment at Faughlin could be raised the necessary height at a cost of not more than £16,000. The majority of the Trustees are, however, averse to the incurring of the risk of ruin, which would be the result to the town and district were the embankment of the reservoir at Faughlin—which is said to be already leaking at more places than one—to give way under the increased pressure which would be put upon it by the raising of the level of the water.

Dearth of Coke in the Birmingham District.—There was considerable excitement in the coke market at Birmingham, last week, owing to the stringency in the supply; and prices were remarkably buoyant. Durham smelters quoted best furnace sorts at 35s. a ton, delivered at Midland stations; being a further advance of 2s. 6d., and a total advance of 5s., since the quarterly meeting. Derbyshire best furnace coke realized £1 a ton at the ovens; and South Wales cokes were practically unobtainable. Gas coke in Birmingham realized from 15s. to 17s. 6d. a ton. Pig iron makers complained that they were unable to increase their output owing to the dearth of coke.

Explosion at the Carlisle Gas-Works.—Last Sunday morning, a serious explosion occurred in the retort-house of the Carlisle Corporation Gas-Works, resulting in injury to three workmen named Robert Little, David Burton, and Robert Gilliland. As carbonizing work is stopped on Sundays, the men were engaged in cleaning the dips of the hydraulic main. They had removed a pipe and were about to clean it when, by some means at present unexplained, the gas issuing from the opening in the main became ignited, and an explosion followed. The three men were severely burnt about the head and face by the hot tar. One of the three got down from the main by the ladder on which he had been standing; but the other two were so blinded that they could not move, and had to be helped down from the top of the retorts. The foreman of the works was promptly on the spot, and doctors were summoned immediately. They were removed to the Cumberland Infirmary; and their condition is considered serious. Mr. Newton, the Gas and Water Engineer to the Corporation, was soon in attendance. We understand that the damage to the works is small, and that it will not interfere with the daily routine. The men were accustomed to the work on which they were engaged; and two had been for some years in the service of the Corporation.

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CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *May* 27.

Sulphate of Ammonia.—Notwithstanding the intervention of holidays, there has been a further sharp advance in prices; the closing quotations being £12 12s. 6d. to £12 15s. per ton, f.o.b. Hull and Liverpool, and £12 17s. 6d. per ton f.o.b. Leith. Shipments for the month have been substantially in excess of those for May, 1898; and everything available has been removed. There has also been a corresponding advance in values for delivery over the summer months, and a good demand in this position. Further ahead buyers have been rather checked by the firmness of sellers; and only a moderate amount of business has resulted. For July-December delivery, £12 7s. 6d. per ton has been paid f.o.b. Leith; and higher prices are now asked. For "January-June, 1900," delivery f.o.b. Leith, the quotation is £12 per ton; and this price would probably be accepted for "October, 1899-March, 1900."

Nitrate of Soda is steady at 8s. per cwt. for fine quality on spot.

LONDON, *May* 27.

Tar Products.—Higher prices are now being offered for tar; buyers evidently being of opinion that the future of products is more hopeful. The recent contracts let, however, are at such prices as could only be viewed in the light of speculation, as the figures paid are not warranted by to-day's value of products. It is true pitch continues steady, with an improving tendency for next season; and creosote and tar oils are realizing unusual prices. But all the other products, without exception, are flat, and more or less unsaleable. Benzol is weak; and toluol, which enjoyed a special market until recently, has now got down into parity with benzol. Solvent naphtha is also dull, and has fallen to a price which has not been reached for many years. The quotation for anthracene, it will be observed, is nominal, as no business is doing; and the little inquiry which commenced a few months ago, and which looked like developing into important business, has entirely fallen off. The production of anthracene, however, is decreasing rapidly, as at the present prices it is not worth anyone's while extracting it from the oil.

Quotations during the week are as follows: Tar, 15s. to 23s. 6d., position and quality regulating the value. Pitch, east coast, 27s.; west coast, 24s. 6d. Benzols, 90's, 6¾d.; 50's, 7¼d. Toluol, 9d. Solvent naphtha, 10d. Heavy naphtha, 11½d. Crude, 30 per cent., naphtha, 3d. Creosote, 3⅜d. Heavy oils, 65s. Carbolic acid, 60's, 2s. 1d.; 75's, 2s. 7½d. Creosote salts, 42s. 6d. Anthracene, nominal, "A," 3¼d.; "B," 2¼d.

Sulphate of Ammonia.—There has been brisk competition for any parcels offering during the week, which looks very much as if dealers have been anxious to cover sales before the end of the month. The article is remarkably scarce; and the demand is exceptionally good. Phenomenal results are said to have been obtained during the past season by the use of sulphate on crops to which it was not formerly commonly applied. The value of sulphate is now out of parity with nitrate, as much as nitrate was out of parity with sulphate some time ago. This shows that there is no relation between the two articles as some would believe. In the earlier part of the week at two ports, sulphate was sold at £13. A slight retrograde movement set in in the middle of the week; and the price to-day may be taken at £12 12s. 6d. to £12 17s. 6d., less 3½ per cent., depending on position.

COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—With collieries throughout Lancashire stopped the greater portion of the past week for the holidays, business has necessarily been to a great extent held in abeyance. In most cases, however, collieries have had to fill up very largely out of stocks prior to the holidays, to meet the requirements of their customers; and the present restricted output can only tend to still further strengthen the market when operations are resumed after Whitsuntide, as throughout the Lancashire district there is a general shortness of supplies in all descriptions, except here and there perhaps in some of the better sorts of house-fire coal. Prices for house-fire coals, steam and forge qualities, and engine fuel are nominally unchanged at quotations last given. There is every probability that these figures will be fully maintained during the summer; and it is not unlikely that in the autumn, when a further advance in colliers' wages is to be conceded, there will be a corresponding upward move in prices. In gas coals, further contracts have been placed during the past week; and in all cases the full advance of 1s. 6d. per ton over last year's rates has been obtained. The basis of prices at which business has been done is about 9s. to 9s. 3d. per ton at the pit for the ordinary qualities of Wigan four-feet gas coals, and from 9s. 6d. to 9s. 9d. for best Wigan Arley screened gas coals.

Northern Coal Trade.—The coal trade of this district is steady; and now that the supplies are adequate, there is a slight ease in the prices. Best Northumbrian steam coals are from 12s. to 12s. 6d. per ton f.o.b.; and steam smalls are 6s. In the gas coal trade, the large local contract to which allusion was made last week has now been practically settled, and at prices that are not very dissimilar to those named—from 8s. 7d. to 9s. per ton being the rates of the settled tenders. These show a considerable advance on the prices of the past year, but are below the figures originally asked. For occasional cargoes of gas coals, the price is about 9s. 3d. per ton f.o.b. High prices are quoted for coke; and this should beneficially influence prices for gas coke, which remain steady.

Scotch Coal Trade.—The continued activity in the iron and allied trades makes coal producers busy at home. Foreign trade is not keeping up, which is partly explained by a scarcity of ships. The good demand at home makes the decline of foreign business scarcely felt. The prices quoted are: Main 8s. 9d. to 9s. per ton f.o.b. Glasgow, ell 9s. 9d. to 10s. 6d., and splint 9s. 3d. to 9s. 6d. The shipments for the week amounted to 179,950 tons—a decrease of 19,182 tons upon the previous week, and of 25,293 tons upon the corresponding week of last year. For the year to date, the total shipments have been 3,034,759 tons—a decrease of 158,206 tons upon the same period of last year.

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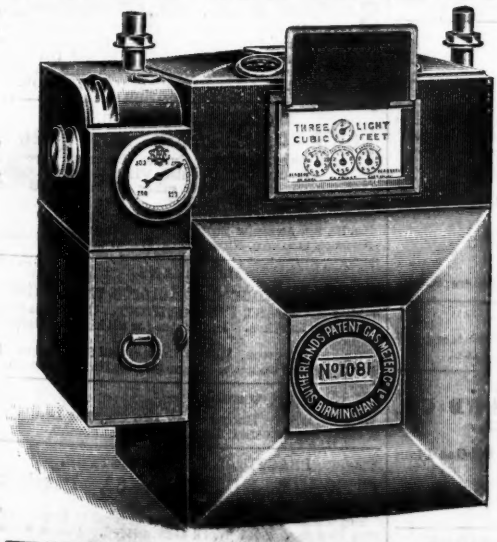

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The Extension of the Grantham Gas-Works.—The Grantham Gas Company are now carrying out the second section of the extensions at their works, in accordance with the scheme of their Engineer, Mr. R. G. Shadbolt, adopted by them some little time ago. This section consists of steam-boiler, exhausting machinery, condenser, scrubber, purifiers, buildings, &c.; and it has been entrusted to the following firms: Boiler, Mr. J. Whitehouse, Ilkeston; two exhausters and engines, Messrs. G. Waller and Co., Stroud; water-tube condenser, tower scrubber, two purifiers (Green's type), and roofs, Messrs. R. Demster and Sons, Elland; buildings, foundations, &c., Messrs. Rudd and Son, Grantham. The rapidly increasing gas consumption renders the speedy completion of these works an absolute necessity; and it is expected that the various contracts, now well in hand, will be completed, and the plant ready for use, by the end of September.

Gas Profits at Cockermouth.—At a recent meeting of the Gas Committee of the Cockermouth Urban District Council, the Manager (Mr. Harold Baker) submitted his report and balance-sheet for the year ending March 31. It showed that, after the payment of interest, and providing £355 for the reduction of the debt, there was a surplus profit for the year of £600. The Committee unanimously recommended that £409 should be added to the reserve fund; that all discounts and differential charges should be abolished as from March 31; that from this date the price of gas should be reduced from 3s. 7d. to 3s. 3d. per 1000 cubic feet net; and that consumers with prepayment meters should be given 22 instead of 20 cubic feet of gas for 1d. The Committee also placed on record their high appreciation of the excellent work done by Mr. Baker during the past year. The report stated that the Council had received £237 more for gas alone, which meant that the sales had increased by upwards of a million cubic feet. The report came before the Council at their meeting on Wednesday, when the Chairman (Mr. J. Straughton) congratulated them on the satisfactory results of the year. There was great cause for congratulation. Mr. W. Stephenson, in moving the confirmation of the Committee's minutes, reminded the Council that there was a considerable amount of capital involved in the works. For every 1000 cubic feet of gas consumed, they had to pay 1s. 1¼d. for interest and sinking-fund charges. This was a pretty considerable burden on any undertaking. He quite agreed with the Chairman that, notwithstanding the heavy capital involved, the purchase of the gas-works had been a decided success. When the Company had them, the price of gas was 4s. 2d. per 1000 cubic feet, and meter-rents were charged; but since the Council had taken them over, they had been able to sell gas for 3s. 7d., while meter-rents had been abolished. Altogether, he thought their position was fairly satisfactory. The Committee did not propose to add to the reserve fund after it had reached £1000. Mr. Bolton said he wished to drive home the point that the ratepayers who were not consumers were entitled, when there was a further big profit, to have their share of it. Mr. Jackson said after the gas had been reduced to a reasonable figure, and an adequate reserve had been created, it might be possible and equitable for the Council to decide what should be done with any surplus funds; but they could hardly consider this until the price was down to 3s. per 1000 cubic feet. The minutes were confirmed

Gas Profits at Oldham.—The annual report of the General Superintendent of the Oldham Corporation Gas Department (Mr. A. Andrew) has lately been issued. It states that the gross revenue for the past financial year was £140,299; and the gross expenditure, £111,676—the balance carried to the profit and loss account being £28,622, and the net profit on the year's working £12,514. The amount to which the Corporation are entitled in aid of the borough fund is £9606; and, with interest and the amount brought forward, there is a credit balance of £6779. Notwithstanding the extension of the area for electric lighting, there is an increase in the gas-rents of £7686, and in the receipts from residual products of £2334. The reserve fund stands at £45,821. The number of consumers at present is 48,174.

An order has been placed with Messrs. C. & W. Walker, Limited, for the supply of four new purifiers to the Mansfield Corporation Gas-Works. The contract price is £3725.

The following exhibitions of gas appliances have recently been held: By Messrs. Fletcher, Russell, and Co., Limited, at Hazel Grove, with Mrs. R. S. Fennah as lecturer, and at Chester, with demonstrations by Miss A. C. Wilkinson. By Messrs. R. & A. Main, Limited, at Brechin and Inverness, with lectures by Miss Young and Miss Griggs.

The Crystal Palace District Gas Company have placed an order with Messrs. W. J. Jenkins and Co., Limited, of Retford, for coke conveying, breaking, and screening plant, to the designs of the firm. It includes a long length of the De Brouwer patent coke-conveyor for dealing with the hot coke as it is drawn from the retorts, and its transmission to large storage hoppers after being broken and screened, or to the coke heap direct, as desired.

At the recent general meeting of the Lamp Manufacturing Company, Limited, the Directors reported that the amount of business done had been in excess of that of any previous year, and the rate of profit well maintained. Under these circumstances, they recommended the payment of the full dividend of 7 per cent. (less income-tax) upon the preference shares, the writing of £287 16s. 9d. off the patent account, the setting aside of £200 as a further provision for bad debts, and the carrying forward of £1319 to the credit of the profit and loss account.

Mr. H. J. Robus, of Bucklersbury, who has lately reported to the Rural District Council of Crowmarsh (Oxon) on the subject of the supply of water to Woodcote, has received instructions to prepare plans, specifications, and estimates in view of an application to be made to the Local Government Board for sanction to a loan to carry out the work. He has also been consulted by the Stowmarket Gas Company on a difficulty which has arisen in connection with their works, which stand upon boggy land at the side of the River Stour. For some time past the construction of a sewer for the town has been going on, and the site for the pumping-station and collecting-tank was immediately adjoining the gas-works. In order to construct the tank and its foundation, continuous pumping had to be carried on, with the result that large cracks have shown themselves in and about the buildings owing to subsidence. Mr. Robus has inspected the works, and sent in his report.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of, PERMANENT ADVERTISEMENTS should be received not later than the FIRST POST on SATURDAY.

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[For Illustrated Advertisement, see May 9, p. 1182.]

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Write CROWTHER, Retort Setter, and Sole Maker of Stickfast Fire Cement, Manor Street, HUDDERSFIELD.

GAS TAR wanted.

BROTHERTON AND CO., Tar Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

PRACTICAL RETORT SETTER.

GEORGE NUTTALL, 32, Havelock Road, Saltley, Birmingham.

Regenerator or other Furnaces erected to Engineers' own Designs. Best Work Guaranteed. Please write for Estimates.

SULPHATE OF AMMONIA SATURATORS.

JOSEPH TAYLOR & CO., Chemical Plumbers, &c., and Makers of every description of Solid Plate Lead and Timber Cased Saturators, &c., CENTRAL PLUMBING WORKS, TOWN HALL SQUARE BOLTON. Special attention to Repairs.

Before placing Orders, please write for Estimate. Telegraphic Address: "SATURATORS, BOLTON."

SHEFFIELD CHEMICAL COMPANY, LIMITED.

BUYERS of Spent Oxide. Sellers of OXIDE OF IRON and SULPHURIC ACID.

IRON OXIDE (Bog Ore), best quality, for the Purification of Gas, containing up to 85 per cent. Hydrated Oxide of Iron, and absorbing while being used a high percentage of Blue.
S. BOWLEY AND SON, Wellington Works, Battersea Bridge, LONDON, S.W.

ADVERTISER desires Situation as FITTER. Well up in Iron and Compo., Cookers, Fires, Main and Service Laying, and Meter Taking. Home or Foreign Appointment. Good Testimonials.
Address No. 3283, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

ADVERTISER desires Situation as Out- DOOR SUPERINTENDENT. Thoroughly conversant with the Slot System, Incandescent Lighting and Distributing Plant. Good References. Fifteen Years' Experience. Used to the control of Men.
Address No. 3284, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

ASSISTANT, thoroughly qualified for a Gas Engineer's Warehouse or Company's Show-Room, accustomed to Workmen, Office Routine, and Soliciting, desires engagement. Twelve Years' Experience. Unmarried. Good References. London or Provinces.
J.B., 73, Burgoyne Road, HARRINGAY, N.

YOUNG Man (aged 30), with Twelve Years' good Experience in the General Management of Water-Works wants SITUATION. Capable of taking charge of Pumping-Station. Understands Main and Service Laying, &c. First-class References.
A. ORBELL, 8, Gwynne Terrace, Exning Road, NEWMARKET.

WANTED, by a practical Working Manager, the MANAGEMENT of a Gas-Works, where the make is from 15 to 20 Millions, or Outside Superintendent of a larger Works. Has held present position five-and-a-half Years. A change desired.
Address No. 3274, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Gas Rental Clerk. Must be accustomed to the routine of a Gas Office.
Apply, with three Testimonials, to the SECRETARY, Gas Offices, MORECAMBE.

WANTED, a Gas Stoker, used to Shovel Charging, Engine and Exhauster. Permanency to an active and steady Man. Wages 30s. per week.
Apply to S. BARK, Gas Office, SUNBURY-ON-THAMES.

WANTED, a competent Gas-Fitter, with experience in Main and Service Laying, Reading Meters, &c., and to make himself generally useful on the Works. Wages 32s. per week.
Apply to S. BARK, Gas Office, SUNBURY-ON-THAMES.

WANTED, a Man for Sulphate Making. Must be capable of working the Continuous System, and willing to make himself useful in a Gas-Works. Wages 33s. per week to a capable Man.
Apply to the GAS COMPANY, Richmond, SURREY.

WANTED, two Carbonizing Foremen, accustomed to Regenerative Furnaces and Inclined Retorts.
Apply, by letter, enclosing *copies* of three recen Testimonials as to Character and Abilities, to No. 3227, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a steady Man who has had experience in Bricklaying and Puddling Gas-holder Tanks.
Apply, by letter, giving References and Wages required, to No. 3279, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GENERAL FOREMAN required at Gas- Works in Midlands. Mechanical Training and good Experience with modern Gas Plant and Manufacture indispensable. Commencing Salary £3 5s. per week. No allowances.
Apply, by letter, stating Age, with References, &c., to No. 3282, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

THE Directors of the Barking Gas Com- pany are prepared to receive APPLICATIONS for the post of MANAGER of their Works at Barking. Must be practically acquainted with the latest methods. Age not exceeding 35.
Applications, with Testimonials as to skill and trustworthiness, to be sent to the SECRETARY of the Company at the London Office, 55 and 56, High Holborn, LONDON, W.C.

EAST DEREHAM URBAN DISTRICT COUNCIL.

MANAGER OF GAS-WORKS.

THE Council invite applications for the Office of MANAGER of their Gas-Works, which Carbonize about 1200 Tons per annum.
Salary, £125 per annum, with House, Fuel, and Lighting.
Applications, marked "Gas Manager," in Candidate's own Handwriting, stating Age and Experience, and accompanied by *copies* of Testimonials, to be sent at once to the undersigned, from whom further Information can be obtained.

B. H. VORES,
Clerk to Urban District Council.
East Dereham, May 29, 1899.

RESIDENT SUPERINTENDENT

WANTED to take the management of of an IMPORTANT GAS-WORKS (under the direction of the Engineer), designed for the carbonization of about 100,000 Tons of Coal per annum, and now in course of development. Good knowledge of construction and of modern Gas Plant and Gas Making are required. Maximum Salary £525 per annum. No allowances. Commencing Salary according to Age and Qualifications.
Apply, by letter, stating Age, References, &c., to No. 3281, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

A LONDON Gas Company require a com- petent MAN to take charge of a Show-Room on their District, and invite applications for the post from Men experienced in the sale of Gas Stoves, Burners, and Fittings.
Commencing Salary £2 per week, with Commission on the amount of Sales effected.
Applications, in the first instance, with *copies* of not more than three recent Testimonials, *which will not be returned*, to be sent to No. 3280, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS MANAGER.

WANTED, by the Witham Gas Com- pany, on the 1st of August next, a competent Man to take charge of their Works. Salary to commence at £80 per annum, with House, Coal, and Gas. Annual Make, about 9 millions.
Applications, by letter only, stating Age, and accompanied by not more than three recent Testimonials, to be addressed to W. B. Blood, Esq., Chairman of the Gas Company, Witham, Essex, on or before the 5th of June. Envelopes to be endorsed "Gas Manager."

FOR SALE, Cheap—Two Circular Cast- IRON TANKS or HOLDERS, 31 feet diameter, 16 feet and 12 feet deep.
D. HOULT, WORKSOP.

FOR SALE—Two Cornish Boilers, by Tangyes, 14 ft. by 4 ft. 6 in., good condition, with Fittings complete. Taken out to make room for larger. Worked under inspection of Boiler Insurance Company, and insured at 60 lbs.
W. E. PRICE, Engineer, Gas Company, HAMPTON WICK.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

FOR SALE, cheap—
Two PURIFIERS, 8 ft. square by 4 ft. deep.
Two " 5 ft. " 4 ft. "
One " 5 ft. " 3 ft. "
One EXHAUSTER, 20,000 Cubic Feet per hour.
Two " 5000 " " "
Also CONDENSERS, SCRUBBERS, WASHERS, GASHOLDERS and TANKS, VALVES, &c., &c.
Apply to SAML. WHILE AND SON, 60, Queen Victoria Street, LONDON, E.C.

THE Wolverhampton Gas Company have FOR SALE, at their Horsley Fields Works, the following SECOND-HAND PLANT comprising: Retort-Fittings, Two Exhausters, Two Steam-Engines, Two Boilers, Two Sets of Vertical Cast-Iron Condensers, Two Scrubbers about 25 ft. by 7 ft., Station Meter, Governor, Cast-Iron Tanks, Weighing-Machine, Roof Principals, &c.
The above can be seen by appointment.
For further Particulars apply to the MANAGER, Gas Company, WOLVERHAMPTON.

CITY OF CARLISLE.

THE Carlisle Gas Committee are pre- pared to receive TENDERS for the supply of COAL and CANNEL required at their Works during One Year from the 1st of July next.
Tenders to be delivered to the undersigned not later than June 3, 1899.
Forms of Tender and other Particulars on application.

C. B. NEWTON,
Engineer and General Manager.
Gas-Works, Carlisle,
May 18, 1899.

CITY OF CARLISLE.

THE Carlisle Gas Committee are pre- pared to receive TENDERS for the purchase of the surplus TAR produced at their Works for a period of One Year from the 1st of July next.
Tenders to be delivered to the undersigned not later than June 3, 1899
Further Particulars can be obtained on application.

C. B. NEWTON,
Engineer and General Manager.
Gas-Works, Carlisle,
May 18, 1899.

COUNTY BOROUGH OF OLDHAM.

THE Gas-Works Committee invite TENDERS for the TAR and AMMONIACAL LIQUOR to be produced at their different Gas Stations for a period of One or more Years, commencing the 1st of July next.
The yearly make of Tar is about 7600 Tons, and of Ammoniacal Liquor about 2,500,000 Gallons.
Particulars and Forms of Tender can be obtained on application to Mr. Arthur Andrew, Gas and Water Offices, Oldham, to whom Tenders are to be sent on or before Tuesday, June 20, 1899.

A. NICHOLSON,
Town Clerk.
Oldham, May 23, 1899.

URBAN DISTRICT COUNCIL OF STOURBRIDGE.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the supply of 14,000 Tons of good screened GAS COAL, or any part thereof, for delivery in equal Monthly quantities during the Year ending June 30, 1900.
Forms of Tender may be obtained on application to the Manager.
Sealed Tenders, endorsed "Tender for Gas Coal," to be addressed to the Chairman of the Gas Committee, and delivered to the undersigned on or before Tuesday, June 13, 1899.

WM. NORTH,
Engineer and Manager.
Gas-Works, Stourbridge,
May 23, 1899.

TENDERS FOR GAS COAL.

THE Directors of the Hartlepool Gas and Water Company invite TENDERS for 45,000 Tons of GAS COAL, to be delivered at their Gas-Works Sidings, West Hartlepool, during the Twelve Months ending the 30th of June, 1900, in such quantities and at such times as may be required.
The Coal must be freshly wrought, clean, free from Sulphurous Pyrites or other objectional matter, and to the satisfaction of the Company's Engineer.
Tenders must state the price per ton of 20 cwt., and whether Screened, Unscreened, or Nut Coal, and be sent to reach the undersigned on or before Tuesday, the 6th prox.
The Directors reserve the right to accept Tenders for the whole or any portion of the quantity offered, and do not bind themselves to accept the lowest or any Tender.

By order,
THOS. TREWHITT,
Secretary.
Hartlepool Gas and Water Company's Offices,
West Hartlepool, May 18, 1899.

SCARBOROUGH GAS COMPANY.

AMMONIACAL LIQUOR.

THE Directors of the Scarborough Gas Company invite TENDERS for the whole of the AMMONIACAL LIQUOR, to be produced at their Works for One or more Years from the 1st day of July next.
Tenders may be submitted either at a fixed Price per Ton or on a Sliding-Scale, regulated by the price of Sulphate. Preference will, however, be given to the latter.
Further Particulars may be obtained on application to the undersigned.
Tenders (duly endorsed) must be delivered, addressed to the Chairman of the Company, not later than Noon, on Saturday, the 10th of June next.
The Directors do not bind themselves to accept the highest or any Tender.

By order,
J. HOLLIDAY,
Engineer and Secretary.
Gas Offices: 32, Westborough,
Scarborough, May 17, 1899.

COUNTY BOROUGH OF HALIFAX.

THE Gas-Works Committee of the Hali- fax Corporation are prepared to receive TENDERS for the supply of—
1. OILS AND PAINTS.
2. BRUSHES.
3. BRASS MAIN COCKS AND UNIONS.
4. WROUGHT-IRON TUBES.
5. CAST-IRON PIPES.
6. INDIA-RUBBER GOODS.
7. BRASS LAMP FITTINGS.
8. SULPHURIC ACID.
9. OXIDE OF IRON.

And for the Purchase of—
1. SPENT OXIDE OF IRON.
2. GAS CARBON.
3. BRIMSTONE.

for the Twelve Months ending the 30th of June, 1900.
Forms of Tender and further Information may be obtained on application to Mr. Thomas Holgate, Engineer, Gas-Works, Halifax.
Tenders, properly endorsed, to be sent to the undersigned before Ten o'clock a.m., on Wednesday, the 7th of June, 1899.
The person whose Tender is accepted will be required to observe the Fair Contracts Clauses adopted by the Corporation.

By order,
KEIGHLEY WALTON,
Town Clerk.

EXMOUTH GAS COMPANY.

TENDERS FOR GAS COAL.

THE Directors of the Exmouth Gas Company invite TENDERS for 7000 Tons or 4000 Tons, at their option for One or Two Years, of unscreened (through and through) first-class NEWCASTLE, DURHAM, or ALDWARKE MAIN GAS COAL, to be shipped in such quantities (by Sailing Vessel only) or by Rail, and at such times as may be required, commencing from the 1st of August next.
Tenders, to be accompanied by Working Analysis, and Prices may be quoted c.i.f. or f.o.b. at Exmouth Docks, or f.o.r. Exmouth Railway Station.
The Coals to be Clean, Dry, and Fresh Worked.
Short Weight or Inferior Quality to be allowed for.
Sealed Tenders to be sent to the undersigned, addressed to the Chairman of the Gas Company, and endorsed "Tender for Coal," not later than Monday, June 5, 1899.
The Directors reserve to themselves the right to accept the whole or any portion of any quantity offered, and do not bind themselves to accept the lowest or any Tender.
No Form of Tender issued.

By order,
JAMES T. FOSTER,
Secretary and Manager.
Gas-Works, Exmouth,
May 18, 1899.

THE Corporation of Middleton are prepared to receive TENDERS for the supply of COAL and CANNEL required at their Gas-Works.

Further Particulars and Form of Tender may be obtained from Mr. T. Duxbury, Gas Engineer.

Tenders, endorsed "Tender for Coal or Cannel," addressed to the Chairman of the Gas Committee, to be delivered at my Office on or before Wednesday, the 14th of June, 1899.

The Corporation do not bind themselves to accept the lowest or any Tender.

FREDERICK ENTWISTLE,
Town Clerk.

Town Hall, Middleton,
May 25, 1899.

COUNTY BOROUGH OF WEST BROMWICH.
(GAS DEPARTMENT.)

TO COLLIERY PROPRIETORS.

THE Gas Committee are prepared to receive TENDERS for the supply of 25,000 Tons of GAS COAL; also 1000 Tons of CANNEL COAL, for use at their Works, Albion, West Bromwich.

The Committee do not bind themselves to accept the lowest or any Tender; and they reserve to themselves the right to divide the Contract between several firms.

Forms of Tender may be obtained upon application to Mr. Thomas Glover, Manager of the Works.

Sealed Tenders, properly endorsed, to be sent to me not later than Friday, the 9th of June.

By order,
THOS. HUDSON,
Secretary.

Town Hall, West Bromwich,
May 20, 1899.

BRIDGNORTH CORPORATION GAS-WORKS.

TO COLLIERY PROPRIETORS AND OTHERS.

THE Gas Committee are prepared to receive sealed TENDERS for the supply of GAS COAL, including carriage to the Bridgnorth Railway Station, for One Year from or soon after the end of July next.

Evidence as to quality of Coal must accompany each Tender.

Quantity required: About 2200 Tons per annum in proportionate deliveries as directed—say, 70 per cent. during Winter Months, and 30 per cent. during Summer Months.

Sealed and marked Tenders must be sent to the undersigned not later than Thursday, the 15th of June.

The Committee reserve to themselves the right to divide the quantity into two or more Contracts, and do not bind themselves to accept the lowest or any Tender.

Official Forms for Tender are not furnished.

By order,
J. H. COOKSEY,
Town Clerk,
Secretary.

Bridgnorth, May 26, 1899.

COUNTY BOROUGH OF BURY.
(GAS DEPARTMENT.)

TENDERS FOR GAS COAL.

THE Corporation are prepared to receive TENDERS for the supply, for One, Two, or Three Years, of—

35,000 Tons of GAS COAL per annum.
500 " BURGY
200 " HOUSE COAL "

The same to be delivered in such quantities and at such times as the Gas Engineer of the Corporation may from time to time order.

Printed Forms of Tender and Conditions of Contract may be obtained on application to Mr. H. Simmonds, Engineer and Manager, Gas-Works, Bury.

Tenders, which must be on the printed forms, and addressed to the Chairman of the Gas Committee, Town Clerk's Office, Bury, endorsed "Tender for Gas Coal," to be delivered not later than Friday, the 16th of June, 1899.

JOHN HASLAM,
Town Clerk.

Corporation Offices, Bank Street,
Bury, May 19, 1899.

SUTTON-IN-ASHFIELD URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)

TENDERS FOR GAS COAL, CANNEL, AND LIME.
TENDERS FOR TAR AND AMMONIACAL LIQUOR.

COAL.

THE Gas Committee of the above District Council are prepared to receive TENDERS for the supply of 600 Tons of CANNEL and 3500 Tons of well screened GAS COAL, to be free from Shale and Pyrites, and to be delivered at the Town Stations (Midland or Great Northern Railways), Sutton-in-Ashfield, in such quantities as the Manager shall from time to time direct, between July 1, 1899, and June 30, 1900.

LIME.

TENDERS for the supply of 150 Tons of LIME to be delivered at either of the above Railway Stations, in such quantities as the Manager shall from time to time direct between above dates. The Lime is to be hand-picked, and clear from Refuse and Ashes.

TAR AND LIQUOR.

TENDERS for the surplus TAR and AMMONIACAL LIQUOR produced at their Works from July 1, 1899, to June 30, 1900.

Tenders for Coal and Lime to state price per ton of 20 cwt. at the Works, or at the above Railway Stations.

No Tender Forms provided.

The Committee do not bind themselves to accept the lowest or any Tender.

Tenders, endorsed, to be addressed as under, so as to arrive not later than the 7th day of June, 1899.

By order,
JOHN D. FIDLER,
Clerk.

District Council Offices,
Sutton-in-Ashfield, Notts.,
May 23, 1899.

THE INCORPORATED

Gas Institute.

THE THIRTY-SIXTH

ANNUAL GENERAL MEETING

OF THE MEMBERS

WILL BE HELD ON

Tuesday, Wednesday, and Thursday,

the 13th, 14th, and 15th of June, 1899,

AT THE

WESTMINSTER TOWN HALL,

CAXTON STREET, WESTMINSTER.

THE CHAIR WILL BE TAKEN BY THE PRESIDENT,

SAMUEL STEWART, Esq.

On Friday, June 16, there will be an Excursion up the Thames. Full Particulars will be announced in the Programme.

The Council expressly desire that Trading Firms will not send Representatives to the Meetings.

THE BENEVOLENT FUND.

The Annual General Meeting of the Donors and Subscribers to the Benevolent Fund will be held on Tuesday, June 13, at the close of the sitting, about Two p.m.

WALTER T. DUNN, Secretary.

13, *Victoria Street, Westminster, S.W.*

COALS.

TENDERS are invited by the Directors of the Knowle and District Gas Company, Limited, for the supply of COALS for the year ending June 30, 1900.

Full Particulars can be obtained from the undersigned.

Tenders, endorsed "Tender for Coals," to be addressed to F. J. WARD, Gas-Works, Knowle, near BIRMINGHAM.

HAWORTH URBAN DISTRICT COUNCIL.

THE above Council are prepared to receive TENDERS for the supply of Four CONDENSERS and a new EXHAUSTER as per Plans and Specifications, which may be seen at the Gas-Works, Haworth.

Tenders to be sent to me not later than Thursday, June 1, endorsed "Tender for Gas Extensions."

WM. ROBERTSHAW,
Clerk.

Burlington Chambers, North Street, Keighley.

TAR AND AMMONIACAL LIQUOR.

THE Directors of the Oakengates Gas Company invite TENDERS for the purchase of the surplus TAR and AMMONIACAL LIQUOR produced at their Works during Twelve Months ending June 30, 1900.

Tenders, endorsed, and sent to the undersigned on or before June 15.

E. PARKER,
Manager.

Gas Offices, Oakengates,
May 27, 1899.

THE Directors of the Skipton Gas Company are prepared to receive TENDERS for the purchase and removal of the surplus TAR and AMMONIACAL LIQUOR produced at their Works during Twelve Months ending June 30, 1900.

Particulars may be obtained from the undersigned, to whom endorsed Tenders may be sent not later than June 13 next.

J. HAIGH,
Secretary.

Skipton, May 16, 1899.

CROYDON COMMERCIAL GAS AND COKE COMPANY.

THE Directors of the above Company invite TENDERS to be sent in before the 9th of June, 1900, for the supply of SULPHURIC ACID and for the purchase of surplus COAL TAR (estimated at about 450,000 gallons) during the Twelve Months ending the 30th of June, 1900.

Particulars may be obtained on application to me.

WILLIAM J. RUSSELL,
Secretary.

Offices of the Company: Katharine Street,
Croydon, May 26, 1899.

TENDERS FOR GAS COAL.

THE Teignmouth Urban District Council invite TENDERS for the supply of about 1000 Tons of the best NEWCASTLE GAS COALS for One Year ending the 31st of May, 1900, in such quantities as may be required from time to time.

Tenders to state the price f.o.b. at the Port of dispatch.

Sealed Tenders, marked "Coals," accompanied by an Analysis of the Coal offered, to be delivered at the Clerk's Office at the Town Hall, Teignmouth, not later than Ten o'clock a.m., on Tuesday, the 6th day of June, 1899.

The Council do not bind themselves to accept the lowest or any Tender.

By order,
W. R. HALL JORDAN,
Clerk.

TAR, AMMONIACAL LIQUOR, AND LIME.

THE Directors of the Barnsley Gas Company invite TENDERS for the purchase of the surplus TAR and AMMONIACAL LIQUOR to be produced at their Works during a term of One or more Years, commencing July 1 next.

Also for the supply of the whole of the LIME required for Purifying purposes during the same periods.

Probable Quantities, and any other Particulars, on application to the undersigned.

Tenders, duly endorsed, addressed to the Chairman, to be delivered to me not later than Thursday, the 8th day of June prox.

The Directors do not bind themselves to accept the highest or any Tender.

By order,
WALTER W. HUTCHINSON,
Secretary and Manager.

Gas Offices, Barnsley,
May 25, 1899.

HUNSTANTON WATER-WORKS.

CONTRACT NO. 4.

THE New Hunstanton Urban District Council are prepared to receive TENDERS for the erection of a WATER TOWER and TANK required at their Water-Works.

Forms of Tender and Bills of Quantities can be obtained on and after Wednesday, the 24th of May, at the Office of the Clerk to the Council, or at the Office of the Engineers, Messrs. Stevenson and Burstal, 38, Parliament Street, Westminster, on payment of One Guinea, which will be returned upon receipt of a *bonâ fide* Tender.

A copy of the Specification and the Drawings can be seen on and after the above-mentioned date at the Office of the Clerk to the Council, or of the Engineers.

Sealed Tenders, endorsed "Tenders Contract, No. 4," are to be forwarded to the undersigned not later than Ten a.m. on Friday, the 2nd day of June, 1899.

J. S. B. GLASIER,
Clerk to the Council.

CHELSEA WATER-WORKS COMPANY.

NOTICE is Hereby Given, that the HALF-YEARLY GENERAL MEETING of the Governor and Company of Chelsea Water-Works will be held at their Office, Commercial Road, Pimlico, in the County of London, on Thursday, the 22nd day of June prox., at One o'clock in the Afternoon precisely, for the General Business of the Company.

The REGISTER OF TRANSFERS WILL BE CLOSED between the 10th day of June prox., and the 22nd day of June prox., both days inclusive.

By order,
G. H. GILL,
Secretary.

Office: 41, Commercial Road,
Pimlico, May 27, 1899.

MALTA AND MEDITERRANEAN GAS COMPANY, LIMITED.

TO THE SHAREHOLDERS.

NOTICE is Hereby Given, that the ORDINARY GENERAL MEETING of the Shareholders of this Company will be held at the Offices, 60, Gracechurch Street, London, E.C., on Tuesday, the 13th of June, 1899, at Twelve o'clock Noon, for the purpose of receiving the Report of the Directors and the Accounts for the Year ended the 31st of March, 1899, and for the transaction of the General Business of the Company.

One of the Directors, Mr. Basil Thomas Makins, retires from office, and offers himself for re-election.

The Auditors, Mr. Robert Hesketh Jones and Mr. Thomas Guyatt, retire, and offer themselves for re-election.

The TRANSFER BOOKS WILL BE CLOSED from the 30th of May until the day of the Meeting, both days inclusive.

By order,
A. W. COOPER,
Secretary.

60, Gracechurch Street, E.C.,
May 16, 1899.

IMPORTANT SALE OF GAS SHARES.

MR. W. H. SWANNELL has received Instructions from the Directors of the Rickmansworth Gaslight and Coke Company, Limited, to SELL BY AUCTION, at the Town Hall, Rickmansworth, on Wednesday, June 7, 1899, at Five o'clock precisely, 700 NEW £5 SHARES; being the issue of Additional Capital of the said Company, ranking for a prescribed rate of Dividend not exceeding 7 per cent., subject to the Sliding-Scale mentioned in the Rickmansworth Gas Order, 1885.

Particulars and Conditions of Sale may be had of HARVEY W. FELLOWS, Esq., Solicitor, RICKMANSWORTH; and of the AUCTIONEER, High Street, RICKMANSWORTH.

"GAS, AND HOW TO USE IT."

A useful little Brochure, suitable for Distribution among Gas Consumers in the District of any Gas Company, and containing

USEFUL HINTS TO GAS CONSUMERS, A COMPARISON OF INCANDESCENT BURNERS WITH ELECTRIC LIGHT, &c.

BY

J. H. TROUGHTON.

Sample Copies 6d. *each.*

100, £2; 250, £4 10s.; 500, £7 10s.; 1000, £10.

The Pamphlet can be specialized to suit the Price of Gas and other Conditions of supply in any particular District, at a slightly increased Charge.

Prices for larger quantities of the Publisher:
WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

KENT WATER-WORKS COMPANY.

SALE BY TENDER OF £40,000 FOUR-AND-A-HALF PER CENT. DEBENTURE STOCK.

MINIMUM PRICE £150 PER CENT.

THE Directors invite Tenders for the Issue, on Sale to the highest bidders, of £40,000 FOUR-AND-A-HALF PER CENT. PERPETUAL DEBENTURE STOCK, authorized to be raised under the Kent Water-Works Act, 1888. The Ordinary Capital of the Company raised is £868,000, which comprises £708,000 Capital Stock, on which the Dividend for the last Half Year was at the rate of 10 per cent. per annum, with a further Dividend of 4 per cent. per annum on account of back Dividends, and £160,000 New Capital Stock, on which the full Dividend of 7 per cent. has been paid since its issue.

The Loan Capital raised is £82,000—viz., £42,000 by Mortgages, and £40,000 by Debenture Stock.

Tenders must be sent in on or before Thursday, the 15th of June.

Forms of Tender, with Particulars and Conditions, may be obtained on application to the Secretary.

Tenders below the Minimum Price of £150 for each £100 of Stock cannot be accepted.

By order of the Directors,
ALEXANDER DICKSON,
Secretary of the Company.

Kent Water-Works Offices,
Mill Lane, Deptford, S.E.,
May 17, 1899.

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his AUCTIONS of STOCKS and SHARES in London, Suburban, and Provincial Gas and Water Companies are held MONTHLY, at the Mart, Tokenhouse Yard, E.C.

He also undertakes the issuing by Auction of Gas and Water Stocks and Shares under Parliamentary Powers.

Terms for issuing such Capital, and also for including Gas and Water Stocks and Shares in these periodical Sales, can be obtained on application at Mr. Alfred Richards's Offices, 18, FINSBURY CIRCUS, E.C.

By order of the Directors.

WESTGATE AND BIRCHINGTON GAS COMPANY.

MR. ALFRED RICHARDS will Sell BY AUCTION, at the Mart, London, E.C., on Wednesday, June 14, at Two o'clock, precisely

500 £10 "C" SHARES
IN THE
WESTGATE AND BIRCHINGTON GAS COMPANY

Ranking for a Maximum Dividend of 7 per cent., and entitled, in view of the distribution on the Company's Ten per Cent. Capital to the 31st of December last, to a *pro ratâ* Dividend of £4 9s. per cent.

Particulars of Messrs. HOUSEMAN & Co., Solicitors, 3, Prince's Street, Storey's Gate, WESTMINSTER, S.W.; and of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

WALKER AND WALLSEND UNION GAS COMPANY.

SALE OF CONSOLIDATED STOCK.

THE Directors have instructed Mr. ROBERT MACK to SELL BY AUCTION, at the Offices of the Newcastle-upon-Tyne and Gateshead Gas Company, 35, Grainger Street West, Newcastle-upon-Tyne, on Tuesday, the 6th day of June, 1899, at Twelve o'clock noon, £7500 CONSOLIDATED STOCK of the Company, to be issued under the powers of the Company's Act of 1884.

For Conditions of Sale and further Particulars, apply to the undersigned.

CHAS. H. ARMSTRONG,
Secretary.

Offices: Mitchell Street,
Walker-on-Tyne, May 6, 1899.

Foolscap 4to, pp. 535, with 239 Illustrations and Steel Plate Engraving (as Frontispiece) of WILLIAM MURDOCH, *Inventor of Gas Lighting. Morocco Gilt, 21s.; Roan Gilt, 18s.*

THE SIXTH (AND CENTENARY) EDITION OF THE

HANDBOOK FOR GAS ENGINEERS AND MANAGERS.

BY
THOMAS NEWBIGGING,
M.Inst.C.E.

LONDON:
WALTER KING, 11, BOLT COURT,
FLEET STREET, E.C.

THE ACETYLENE ILLUMINATING CO., LTD.,

MANUFACTURERS OF CARBIDE OF CALCIUM,
63, QUEEN VICTORIA STREET, LONDON, E.C.,
and FOYERS, SCOTLAND.

(The Acetylene Illuminating Company, Limited, Incorporated in May, 1895, as a Private Development Company, was the First Undertaking established in Europe for the Manufacture of Carbide of Calcium.)

NOTICE.

THE Acetylene Illuminating Company, Limited, possesses an exclusive Licence for the United Kingdom to use for the manufacture of Carbide of Calcium for Light, Heat, and Power Purposes, the Inventions which are comprised in Mr. Willson's British Letters Patent. The Company is also similarly licensed under the British Letters Patent owned by the British Aluminium Company, Limited, so far as these relate to the manufacture of Carbide of Calcium for the same purposes.

The Patents have been submitted to Mr. Fletcher Moulton, Q.C., Mr. Roger Wallace, Q.C., and Mr. Arthur Colefax, who have given the following joint opinion:—

"In our opinion The Acetylene Illuminating Company, Limited, by their Patents control the process "by which alone Calcium Carbide can be commercially produced by electricity, and are also "entitled thereunder to prevent the importation into "this country of Calcium Carbide so produced."

The Acetylene Illuminating Company, Limited, are determined to permit of no Infringement of their Patent Rights, and have brought an Action against the Midland Acetylene (Parent) Syndicate, Limited, to restrain them from manufacturing Carbide of Calcium by means of the Electric Furnace. The Acetylene Illuminating Company intend in future to bring actions against all Infringers of their Patents, whether Manufacturers or Importers, and against all Purchasers of Carbide of Calcium made or imported in Infringement of their Patent Rights.

NOTICE.

THE Acetylene Illuminating Company, Limited, having published and issued an advertisement or circular claiming that they hold the British Patents for the Manufacture of Calcium Carbide by means of the Electric Furnace, we guarantee to indemnify anyone who buys Carbide from us against any claim by "The Acetylene Illuminating Company, Limited," or anyone else.

THE READ-HOLLIDAY ACETYLENE COMPANY, LIMITED, Acetylene Gas Engineers and Carbide of Calcium Manufacturers, HUDDERSFIELD.

NOTICE.

THE Acetylene Illuminating Company, Limited, having published and issued an advertisement or circular claiming that they hold the British Patents for the Manufacture of Calcium Carbide by means of the Electric Furnace, we guarantee to indemnify anyone who buys Carbide from us against any claim by "The Acetylene Illuminating Company, Limited," or anyone else.

TINKER AND HOLLIDAY, LIMITED, Carbide of Calcium Manufacturers, HAZELHEAD, SHEFFIELD.

NITRATE of Thorium and Cerium. FABRIK CHEMISCHER PRAEPARATE VON STHAMER, NOACK, AND CO., HAMBURG.

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Coke	68 per Cent.

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ANALYSIS.

Yield of Gas per Ton. .	10,500	Cubic Feet.
Illuminating Power .	16·9	Candles.
Coke	66·7	Coke.
Sulphur	0·86	Sulphur.
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For use in the

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HOLMSIDE

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Present Daily Produce over 5000 Tons.

Latest Analysis—By CHARLES PHILLIPS, Gas Examiner to Rotherham Corporation

Yield of Gas per Ton . . .	11,205 Cubic Feet.
Illuminating Power	16$\frac{7}{10}$ Stand. Sperm. Candl.
Coke (of good & pure quality)	13$\frac{3}{4}$ Cwt. per Ton.
Sulphur	A little over 1 per Cent.
Ash	Under 1 per Cent.
Tar	163 lbs. (Avoir.) per Ton.
Ammoniacal Liquor	103 lbs. (Avoir.) per Ton.

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England and on the European Continent; London alone consuming about half the produce.

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Present Daily Produce available 3000 Tons.

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THORNLEY AND WHEATLEY HILL COLLIERIES.

Analysis made by

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Illuminating Power . . .	16·9 Candles.
Coke (of good quality) . .	67·5 per Cent.
Sulphur	0·58 ,,
Ash	2·73 ,,

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THE PATENT

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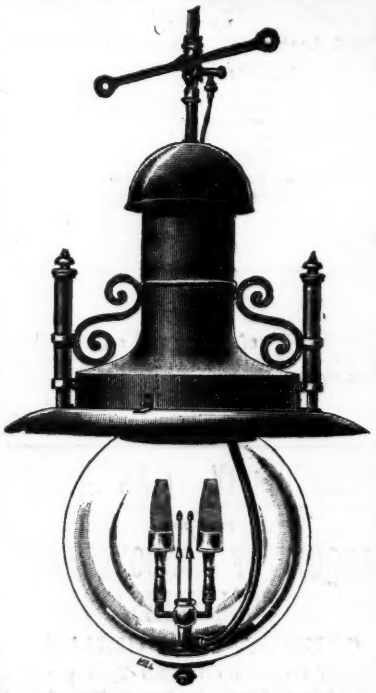

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PIPES and CONNECTIONS, 1½ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

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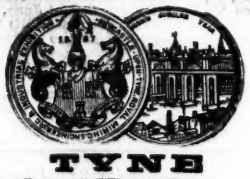

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Illuminating Power	38·22 candles
Coke per ton	1,301·88 lbs.

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Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	17·8 candles.
Coke	70 per cent.

SOUTH PELAW MAIN GAS COAL.

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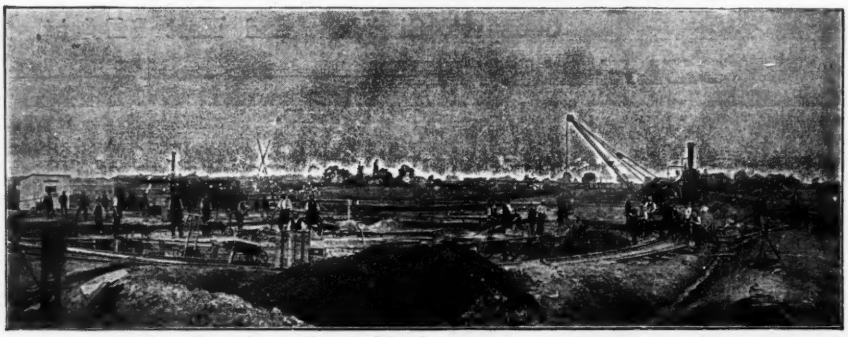

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For Carbonizing Advt. see last Issue.

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Important Improvements in Spent Lime Recovery

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Enquiries respectfully solicited. Full Particulars as to Cost of Plant, Cost of Production of Quick-Lime per Ton, together with Samples of the Restored Material (if desired), on application to

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IMPROVED WET GAS-METERS IN CAST-IRON CASES,

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IMPROVED DRY GAS-METERS.

Speciality: PATENT CASH PREPAYMENT METERS.

CATALOGUE SENT ON APPLICATION.

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TESTIMONIAL

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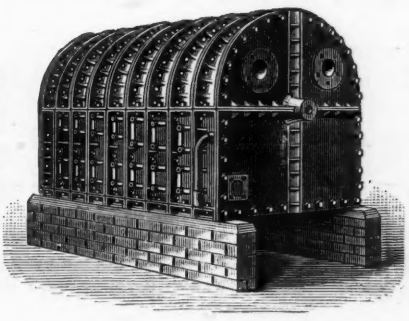
Gas-Works, Buckland,
Dover, Feb. 8, 1899.

H. KIRKHAM, Esq.

Dear Sir,—Have now made further tests with the Washer fitted with your PATENT WASHING DEVICES, and have much pleasure in reporting that *the results were highly satisfactory*; also, I ascertained that the maximum results were obtained when the machine was working at three revolutions per minute. At this speed 13 to 14 gallons of water per ton of coal carbonized were converted into 10-oz. Ammoniacal Liquor, and at same time the Gas was free from Ammonia.

Should you wish further details, I will forward them.

I am, dear Sir, yours truly,
RAPHAEL HERRING, Engineer.



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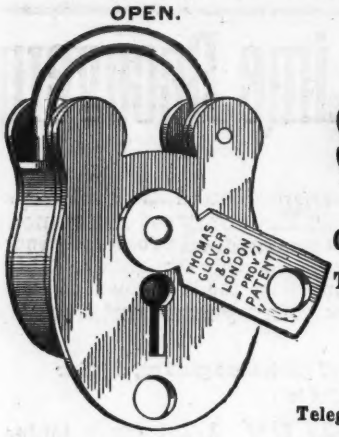

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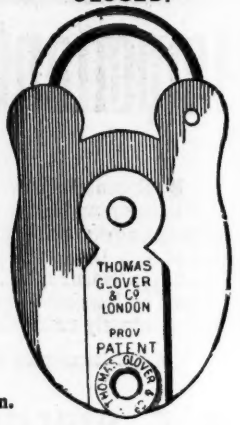

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WORTLEY FIRE-CLAY WORKS,

Near LEEDS,

Have confidence in drawing the special attention of GAS ENGINEERS to the following advantages of their Retorts:—

1. Smooth interior, preventing adhesion of Carbon.
2. They can be made in one piece up to 10 feet long.
3. Uniformity in thickness, ensuring equal Expansion and Contraction.

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MACHINE-MADE GAS-RETORTS.

THE THAMES BANK IRON CO.

UPPER GROUND STREET, LONDON, S.E.,

SUPPLY FROM STOCK

CAST-IRON RETORTS

AND ALL KINDS OF GAS-WORKS APPARATUS.

SOCKET-PIPES FOR GAS OR WATER PURPOSES.

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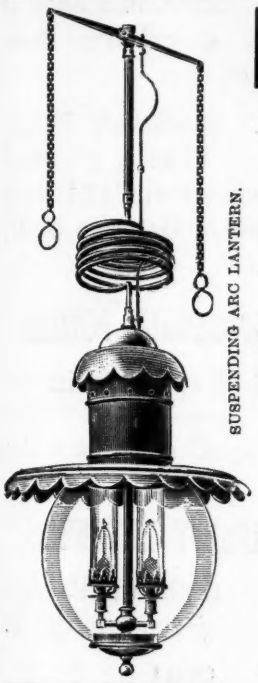

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The disastrous effects of SHOCKS and VIBRATIONS may now be done away with by the use of

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which are the next best thing to UNBREAKABLE MANTLES.

The Illustrations show two of our arrangements; but we are able to cope with all conceivable conditions or requirements.

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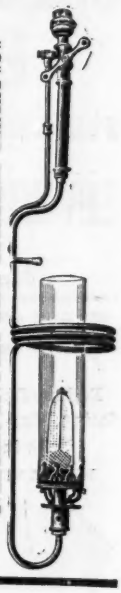

"C" BURNER SUSPENDED WITH BYE-PASS OVERHEAD.

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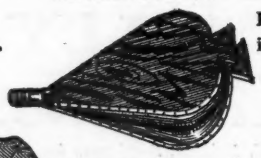

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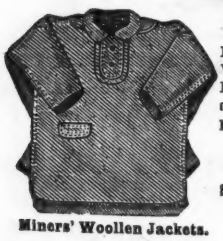

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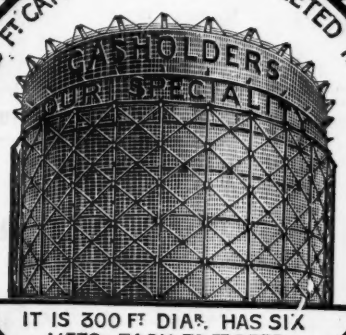

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(See also Advt., p. 1420.

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